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SUB-FOSSIL CRUSTACEANS FROM THE COASTS OF AUSTRALIA.

By R. ETHERIDGE, JUNR., Curator,

AND

ALLAN R. McCULLOCH, Zoologist.

(Plates i-vii.; Fig. 1.)

I.—INTRODUCTION.

At various beaches on the south, south-east, north, and north-west coasts of Australia, remains of Decapoda more or less encased in clay-nodules, are every now and then brought to light, but very few facts appear to have been gathered as to their mode of occurrence when *in situ*. Again, similar animal remains have been met with in excavating canals in delta deposits, only in such instances they are less markedly nodular, and have undergone a lesser degree of fossilisation. A third occurrence is that of river, or perhaps estuarine, deposits brought to light through dredging operations.

As an instance of the first mode of occurrence we cite Anson Bay, North-west Australia; of the second the Coode Canal, Yarra River Delta; and of the third dredging operations carried on at the mouth of the Brisbane River, Moreton Bay. All of these occurrences will be referred to later.

II.—HISTORY.

The first to describe one of these semi-fossil Decapoda from Australia was Prof. Thomas Bell, of King's College, London. It appears he received from Mr. W. Sharp Macleay, a macruran which he referred to the genus *Thalassinia* as *T. emeryi*, naming it after a "Mr. Emery" who apparently was the collector, but unfortunately neither locality nor geological information accompanied the specimen; it was simply said to have been derived from "New Holland." The first description of the *Thalassinia* appeared in the "Proceedings

of the Geological Society," for 1844,¹ followed in the next year (1845) by republication in the "Quarterly Journal."² A notice of the reading of Prof. Bell's paper, however, appeared in "Annals of Natural History"³ for 1844, and in this brief notice the fossil is termed *Thalassinia antiqua*. In compiling his "Index Palæontologicus," Dr. H. G. Bronn, evidently unaware of Bell's papers proper, adopted the unauthorised name *antiqua*⁴ for the Australian sub-fossil. In his papers Prof. Bell frankly confessed his inability to distinguish but little difference between his *T. emeryi* and the recent *T. anomala*, Herbst.

The collector spoken of as "Mr. Emery," was no doubt Lieut. James B. Emery, R.N., an officer of H.M.S. "Beagle," during her exploration of the north and west coasts of Australia between 1837-1843, under Commander J. Dort Stokes.⁵ Now, as the "Beagle" visited Shoal Bay, contiguous to Anson Bay from where most of our examples come, it is quite possible the type specimen was obtained from one or another of the rich deposits in the extreme north-west.

From 1845 onwards nothing more appears to have been written on Australian sub-fossil Crustacea until 1866, when Mr. S. H. Wintle described two crabs from an estuarine deposit at the mouth of the Yarra River, Hobson's Bay; one he called *Phlyxia laris* and the other *Utica*, sp.,⁶ and associated with them were the remains of the Freshwater Grayfish (*Astacopsis franklini*, McCoy). These were "found in nodules of a highly calcareous cement occurring in great abundance in the old estuarine bed of the river Yarra Yarra, which has been exposed in excavating for docks, and also in the cutting for the Coode Canal at Fisherman's Bend." In the same year Mr. Wintle read⁷ a paper before the Royal Society of Tasmania of a similar nature, wherein he named two forms—*Utica yarraensis* and *U. haswelli*.

¹ Bell—Proc. Geol. Soc., iv., 1844, p. 360, fig.

² Bell—Quart Jour. Geol. Soc., i., 1845, p. 93, fig.

³ Ann. Nat. Hist., xiv., 1844, p. 455.

⁴ Bronn—Index Pal., i., 2, 1848, p. 1265.

⁵ Stokes—Discoveries in Australia, ii., 1846, p. 93.

⁶ Wintle—Vict. Nat., iii., 1886, p. 110.

⁷ Wintle—Proc. R. Soc. Tasm. for 1886 (1887), p. 233.

The *Philyra laevis* is probably intended for *Philyra laevis*, Bell, which is a very common species in Victorian waters, more particularly as there is no species *laevis* in the genus *Philyra*, so far as we know. Of *Utica*, the only recent Australian species were described by Prof. W. A. Haswell from Port Denison, Queensland, and it is most unlikely the crabs so referred by Wintle were correctly named. As to the *Astacopsis*, *A. franklini*, Gray (*non* McCoy) is not a Victorian but a Tasmanian species.

It appears crabs, in a similar condition to our *Thalassinia* from the north, are also found on the New Caledonian coast, for Prof. A. Milne Edwards refers^b to the occurrence of *Macrophthalmus latreillei*, Desmarest. Even here the crabs were in a bluish-grey very hard calcareous clay, in fact, very much like the matrix from different spots on our north-west coast.

One other reference only is known beyond Wintle's brief notices—about 1880 Dr. R. L. Jack forwarded to one of us a rolled limestone nodule found on the beach at Townsville, but he was unable to throw any further light on it. The nodule contained the abdominal somites and portion of the appendages of a *Thalassinia*, seemingly *T. emerii*, Bell.^a In a footnote to the description Dr. Jack said:—"A number of specimens, apparently of this same species were collected by the late Mr. James Smith (Collector to the Geological Survey of Queensland) shortly before his death, at Casuarina Island, Keppel Bay."

III.—MODES OF OCCURRENCE.

We possess information on this point only from the three localities mentioned in the introductory remarks, and also from Derby.

1. *Anson Bay*, embouchure of the Daly River, North Australia.—Examples of *Thalassinia emerii* from this locality were first sent to one of us by Mr. H. Y. L. Brown, late Government Geologist of South Australia, in 1908, with the following information:—"The calcareo-argillaceous nodules are found on the beach at the foot of a low cliff (Pl. vii.) composed of sand, clay, and grit topped by red loam, as water-worn fragments. They are also found embedded in a blue clay below high-water mark, and here probably the nodules are in place.

^a A. Milne-Edwards—Nouv. Ann. Mus. Hist. Nat., ix., 1873, p. 278.

^b Etheridge—Geol. Pal. Q'land, &c., 1892, p. 639, pl. 36, fig. 6.

A valued correspondent of this museum, Mr. W. T. Watkin Brown, obtained a number of these fossiliferous nodules from Anson Bay; these are now here. Besides confirming Mr. H. Y. L. Brown's information, his collector informed him that the nodules are plentiful on the beaches after south-east winds, when they are washed out of the mud (= blue clay of H. Y. L. B.) below high-water mark, or by the action of the waves on a low mud bank above tidal influence; this last is probably a gradual reformation of the blue clay in question.

With the view of ascertaining how far fossilisation had been carried, portions were submitted to our colleague, Dr. C. Anderson, for qualitative analysis. He reports as follows:—"These remains have suffered a considerable degree of replacement and petrification. I could find no undoubted evidence of the presence of chitin and the exoskeleton is (partly at least) dolomitized. The interior is filled with a hard magnesian limestone showing vugs lined with secondary crystals.

2. *Derby*.—From information supplied to us by Mr. W. D. Campbell, late of the Geological Survey of Western Australia, the occurrence of these Crustacea at Derby is much the same. He says:—"The nodules are found at low-water spring-tides near Derby Wharf, in the hollows of runs of water formed in the river banks, and appear to have been washed out of the grey clay of the river bed and banks which appears to form the valley flat."

3. *Coode Canal and Yarra River Delta, Melbourne*.—In 1878 seven bores were driven through the Estuarine deposits of the delta preparatory to excavating a water-way, now known as the New Channel, to deflect the course of the river Yarra round the great bend enclosing Coode Island, and opposite Footscray. We are indebted to Mr. R. Rudd, Secretary to the Melbourne Harbour Trust Commission, for a map showing the positions of these bores, and journals of the same. From the latter we gather no rock was encountered, but the rods invariably passed through sand or silt, or both, in most instances followed by soft blue or black clay, and this again by hard, tough blue and yellow clay, the latter the lower of the two. The position of the soft yellow clay varied from fourteen to twenty-one feet from the surface, that of the tough clays from eighteen to thirty-seven feet. The thickness of the soft blue clay varied from two feet six inches

to eighteen feet, and of the tough clays combined from eight to twenty-five feet. The appearance of the few sub-fossil Crustacea seen from this deposit leads us to believe they came from the bottom tough yellow clay; we have not seen any remains in calcareous cement nodules as described by Mr. Wintle.

k. *Entrance Brisbane River, Moreton Bay.*—Mr. J. H. Stevens, Inspector of Fisheries, Brisbane, informs us that the sub-fossil Crustacea from this locality were obtained from the New Channel Cutting at the entrance to the Brisbane River, now forming the main waterway.

The cutting was dredged through a large bank about half a mile wide, a continuation of Fisherman Island. Previous to the dredging operations the bank was covered with about two feet of water at ordinary low-water spring tides, but at very low tides parts of the bank were quite exposed; the depth of the channel is now twenty-eight feet. The specimens collected came from a depth of about sixteen feet from the surface in sand and mud. Mr. Stevens considers the bank had evidently accumulated through the deposition of sediment from the floodwaters of the Brisbane River.

The aspect of these Crustacea is quite different from those obtained further north and north-west. The matrix is a hard ochre-coloured, slightly calcareous mud. Dr. Anderson also submitted portions of these to a qualitative analysis, and informs us that:—"Portions of the exoskeleton, cleaned as completely as possible from adhering matrix, were treated with hot dilute hydrochloric acid. A fragment of a chelipede became converted into a white, soft, amorphous substance, which readily carbonised on heating. Portion of the carapace was attacked less readily and left some inorganic residue, but the presence of organic matter was proved as before. These experiments indicate that there is little or no petrification; there is some infiltration of mud or clay, particularly in the case of the less dense carapace, and it is apparent that, as we should expect, the proportion of organic matter is lower than in a recent specimen (tested for comparison), but a considerable amount of chitin still persists in the skeleton."

IV.—LOCALITIES.

The following is a complete list of the localities yielding these sub-fossil remains of one kind or another:—

A.—*Littoral Deposits*—

1. Derby, Fitzroy River, Kimberley, North-west Australia (Collection of the Geological Survey of Western Australia—W. D. Campbell).
2. Anson Bay, North Australia (Australian Museum—Messrs. H. Y. L. Brown and W. T. Watkin Brown).
3. Daly River, North Australia (Queensland Museum).
4. Coast west of Darwin (or Palmerston), North Australia (Australian Museum—Messrs. H. W. Christie and F. L. Godfrey).
5. Darwin (or Palmerston), North Australia (Queensland Museum).
6. Beach at Normanton, Gulf of Carpentaria, North Queensland (Australian Museum—P. G. Black).
7. Beach at Townsville, North-east Queensland (Collection of the Geological Survey of Queensland—R. L. Jack).
8. Casuarina Island, Fitzroy River, East Central Queensland (*Ibid.* and J. Smith).
9. Golden Shore, Curtis Island, Port Curtis, East Central Queensland (Australian Museum—A. J. Vogan).
10. Ocean Beach, near Jumping Pin, Stradbroke Island, Moreton Bay, South-east Queensland (Australian Museum—A. R. McCulloch).

B.—*Estuarine Deposits*—

11. New Channel, mouth of Brisbane River, Moreton Bay, South-east Queensland (Queensland and Australian Museums—J. H. Stevens).
12. Newcastle Harbour, New South Wales (Australian Museum—W. Cantrill).
13. Coode Canal Works, Yarra Delta, Hobson's Bay, Victoria (Australian Museum—S. H. Wintle).

V.—DESCRIPTION OF THE SPECIES.

Family THALASSINIDÆ.

Genus THALASSINA, Latreille.

THALASSINA ANOMALA, Herbst.

(Plate i., figs. 1-3).

Thalassina anomala (Herbst), Ortmann, Zool. Jahrb., vi., 1892, p. 52 (synonymy).

Thalassina emerii, Bell, Quart. Journ. Geol. Soc., i., 1845, p. 93, figure. *Id.*, Etheridge, Geol. Pal. Q'land., etc., 1892, p. 639, pl. 36, fig. 6.

Thalassina antiqua, Bell, Ann. Nat. Hist., xiv., 1844, p. 455 (*nomen nudum*).

Thalassina maxima, Hess, Arch. Nat., xxxi., 1865, p. 37, pl. 7, fig. 18.

A large number of fragments, in a more or less perfect state of preservation, agree in detail with recent specimens of *T. anomala*, and indicate that *T. emerii*, which was described from a fossil similar to ours, is synonymous with that species. Bell noted that his specimen scarcely differed from a recent example, but relied upon the development of the epimeral portions of the abdominal segments, and of the terminal joint to distinguish *T. emerii*. These characters are variable in a series of *T. anomala*, however, they being proportionately larger in the adult than in the young. The development of the tubercles and spines on the carapace also increases with age.

This Crustacean is a tropical species, living in large burrows in the mud of mangrove swamps. According to Hess, the specimen on which his *T. maxima* was based, came from Sydney, but the species is not known to occur south of Queensland.

Locs.—(Golden Shore, Curtis Island, and Casuarina Island, Fitzroy River, Queensland (Austr. Mus.—*R. L. Jack*); Beach deposit at Townsville, North-east Queensland (Austr. Mus.—*R. L. Jack*); Darwin, North Australia (Q'land Mus.); Coast west of Darwin (Austr. Mus.—*H. W. Christie* and *F. L. Godfrey*); Anson Bay, North Australia (Austr. Mus.—*H. Y. L. Brown* and *W. T. Watkin Brown*); Daly River, Anson Bay (Q'land Mus.); Derby, Fitzroy River, Kimberley, North-west Australia (Geol. Survey W. Austr.—*W. D. Campbell*).

Family CALAPPIDÆ.

Genus PARACYCLOIS, *Miers*.PARACYCLOIS GRANDISPINIS, *sp. nov.*

(Plate ii, fig. 3; Fig. 1).

Carapace convex, broadest at a point a little in advance of the middle of the length. Its dorsal surface is everywhere finely granular, and rendered uneven by the presence of numerous smooth and low tubercles, which are largest in the middle, and decrease in size as they approach the margins; they are smallest on the hinder part of the branchial regions. The grooves defining the cardiac and intestinal regions are broad and deeply impressed. Front divided into three parts, the median one being pyramidal and turned slightly upward; the two outer lobes are on a higher plane, and separated from the orbital margin by a furrow. Orbits directed obliquely upwards, their margins a little sinuous, finely granular, and each has a very indefinite indication of a median suture above. Eye-peduncles short, thick, and granular.



Fig. 1.

Lateral margins evenly curved, extending forward to below the centres of the orbits; they are studded with a row of small tubercles, which gradually enlarge on the postero-lateral portions, and merge into the five large teeth with which these parts are armed; of these the penultimate one is much bigger than the others, and the last is about the same size as the second. Posterior margin wanting. Sub-hepatic region granular like the carapace, defined below by a row of tubercles similar to those of the antero-lateral margins. Pterygostomian regions smooth.

The orbits, epistome, and antennal parts appear to have been very similar to those of *P. malac-edwardsii*, Miers, though several of the more important portions are lost. The carapace also resembles the figure of that species in most of its details, the most important difference lying in the great development of the postero-lateral spines in the fossil.

The occurrence of this genus in Australian waters is interesting as the above-mentioned species from the Admiralty Islands appears to be the only one previously known.

Loc.—Estuarine deposit, Yarra Delta, Melbourne, Victoria (Australian Museum).

FAMILY PODOPHTHALMIDÆ.

Genus PODOPHTHALMUS, *Lamarck*.

PODOPHTHALMUS VIGIL, *Fabricius*.

(Plate iv., fig. 3; Plate v., fig. 3).

Podophthalmus vigil (Fabricius), Leach, Zool. Miscell., ii, 1815, p. 149, pl. cxviii. *Id*, Miers, "Challenger" Rept., Zool., vii., 1886, p. 207 (references).

Two incomplete carapaces and abdominal parts, with the basal joints of the legs attached, agree in detail with a specimen in the Australian Museum from Mauritius. The species has not hitherto been recognised from Australia, though it occurs throughout the Indo-Pacific region.

Loc.—New Channel, mouth of Brisbane River, Moreton Bay (Austr. and Q'land Mus.—*J. H. Stereus*).

FAMILY PORTUNIDÆ.

Genus SCYLLA, *de Haan*.

SCYLLA SERRATA, *Forsk.*

(Plate ii., figs. 1-2).

Scylla serrata (Forsk.) Alcock, Journ. Asiat. Soc. Bengal, lxviii. (n. ser.), 1899, p. 27.

The collection received from the Queensland Museum includes the ventral surface and abdomen of a large female example, to which the meropodites of all the legs, and portion of the left hand are attached. We have also two well preserved lower right-hand fingers. They do not differ from those parts of the common, and widely distributed Mangrove Crab, *Scylla serrata*.

Locs.—Wharf at Derby, Fitzroy River, Kimberley, North-west Australia (Geol. Survey, W. Austr.—W. D. Campbell). New Channel, Mouth of Brisbane River, Moreton Bay (Austr. & Q'land Mus.—J. H. Stevens).

Genus PORTUNUS, *Fabricius*.

PORTUNUS PELAGICUS, *Linnaeus*.

Neptunus pelagicus (Linnaeus), Alcock, Journ. Asiat. Soc. Bengal, lxviii. (n. ser.), 1899, p. 34.

A much damaged carapace and portion of a right chela agree with recent specimens of this common, and widely distributed swimming-crab.

Loc.—New Channel, Mouth of Brisbane River, Moreton Bay, Queensland (Austr. Mus.—J. H. Stevens.)

Family XANTHIDÆ.

Sub-family GALENINÆ.

Genus GALENE, *de Haan*.

GALENE HISPINOSA, *Herbst*.

(Plate iii., figs. 3-4).

Cancer (Galene) hispinosus (Herbst), de Haan, Faun. Japon. Crust., 1835, p. 49, pl. v., fig. 2.

Galene hispinosa, Alcock, Journ. Asiat. Soc. Bengal, lxvii. (n. ser.), 1898, p. 136.

A fine series of one hundred and two specimens, 30-74 mm. across the carapace, includes both sexes, and exhibits considerable growth variation. In the smaller specimens the granules

on the carapace and chelipeds are much more numerous and more prominent than in the larger ones. On the hand they are very large and arranged in rows which extend almost across the outer face of the palm, whereas in the oldest examples they are confined to its posterior portion, the greater part of the outer surface being smooth. Similar variation has been noted by Alcock.

Locs.—Though this species has not been previously recorded from Australia, there are recent specimens in the Australian Museum which were taken by the F.I.S. "Endeavour," seven miles N.N.E. of Bowen, Queensland, in 16 fathoms.

New Channel, Mouth of Brisbane River, Moreton Bay Queensland (Austr. and Q'land Mus.—*J. H. Stevens*).

Family GRAPSIDÆ.

Sub-family SESARMINÆ.

(Genus *SESARMA*, *Say*.)

SESARMA SMITHII, *Milne Edwards*.

(Plate iii., figs. 1-2).

Sesarma smithii (Milne Edwards), McCulloch, Rec. Austr. Mus., ix., pt. 3, 1913, p. 322 (references).

A damaged carapace and several fragments of legs, together with a complete hand and fingers, are in the Australian Museum collection. They agree perfectly with the specimens recently recorded by the junior author from Queensland.

Loc.—Casuarina Island, Fitzroy River, Keppel Bay, Queensland (Geol. Survey Q'land.—*J. Smith*).

Family MACROPHTHALMIDÆ.

(Genus *MACROPHTHALMUS*, *Latreille*.)

MACROPHTHALMUS SERRATUS, *Adams & White*.

(Plate iv., figs. 1-2).

Macrophthalmus serratus (Adams & White), Miers, "Challenger" Rept., Zool., xvii., 1886, p. 250, pl. xx., fig. 1.

? *Macrophthalmus latreillei* (Desmarest), A. Milne Edwards, *Nouv. Arch. Mus. Paris*, ix., 1873, p. 278, pl. xiii., fig. 3 (*fide* Ortmann, *Zool. Jahrb.*, vii., 1897, p. 747).

A very fine specimen, having the carapace and one cheliped almost complete, together with the meropodites and basal joints of all the legs, is well represented by Miers' excellent figure of *M. serratus*. It differs from A. Milne Edwards' figure of *M. latreillei* only in having four instead of three lateral teeth, but as the last is small, and, according to Miers, subject to variation in development, this is probably an unimportant character.

M. latreillei was originally described from fossilised specimens from the East Indies and Luzon, and some interesting details and conclusions are given by A. Milne Edwards, who had both fossil and recent specimens from New Caledonia.

Loc.—Ocean Beach, near Jumping Pin, Stradbroke Island, South-east Queensland (Austr. Mus.—A. R. McCulloch).

MACROPHTHALMUS SEFOSUS, Milne Edwards.

(Plate v., figs. 4-5; Plate vi., fig. 1).

Macrophthalmus sefusus (Milne Edwards), Ortmann, *Zool. Jahrb.*, x., 1897, p. 343 (references).

Two specimens lying one upon the other, are identical with this common New South Wales species.

The recent specimen figured is an adult male collected at Ryde, on the Parramatta River.

Loc.—Estuarine deposit, forty feet below the surface at Newcastle, New South Wales (Austr. Mus.—W. Untrill).

MACROPHthalmus DEPRESSUS, Rüppell.

(Plate v., figs. 1-2; Plate vi., fig. 2).

Macrophthalmus depressus, Rüppell, 24 Krab. Roth. Meer., 1830, p. 17, pl. iv., fig. 6. *Id.*, Ortmann, Zool. Jahrb., x., 1897, p. 342. *Id.*, Alcock, Journ. Asiat. Soc. Bengal, lxi. (n. ser.), 1900, p. 380. *Id.*, Grant & McCulloch, Proc. Linn. Soc. N.S. Wales, xxxi., 1906, p. 21.

Macrophthalmus affinis, Guérin, Mag. Zool., viii., 1838, p. 7, pl. xxiv., fig. 2. *Id.*, Haswell, Cat. Austr. Crust., 1882, p. 88.

Four fossil specimens do not differ from the recent ones recorded from Queensland by Haswell as *M. affinis*, and Grant and McCulloch as *M. depressus*. They all differ from the original figure of *M. affinis* however, in having the carapace narrower at the outer orbital angles than at the third lateral tooth. For their identification as *M. depressus* we have relied upon the descriptions of Ortmann and Alcock, Rüppell's original description and figure not being available to us.

The accompanying figure of a recent example represents a typical Australian specimen from near Fremantle, Western Australia.

Loc.—Beach deposit at Townsville, North-east Queensland (Geol. Survey Q'land.—*R. L. Jack*).

Genus HEMIPLAX, Heller.

HEMIPLAX LATIFRONS, Haswell.

(Plate iv., figs. 4-5; Plate vi., figs. 3-4).

Macrophthalmus latifrons, Haswell, Proc. Linn. Soc. N.S. Wales, vi., 1881, p. 549, and Cat. Austr. Crust., 1882, p. 90.

The form of the front excludes this species from the genus *Macrophthalmus* in which it was placed by Haswell. It agrees in all its generic characters with *Hemiplar hirtipes*, Heller, from which it is separated specifically by its longer eye-stalks, narrower front, and more slender legs, etc

The specimen figured on Pl. vi., fig. 3, is a young male from Victoria, which measures 17 mm. across the carapace. It differs from the type, and another larger example from Tasmania, only in having the hands and wrists proportionately broader and shorter; we have figured these joints of the Tasmanian specimen in fig. 4.

H. lutifrons is represented in the collection of sub-fossils by three carapaces, one of which is sufficiently perfect to leave no doubt of its correct identification

Loc.—Estuarine deposit, Yarra Delta, Melbourne (Anstr. Mus.—S. H. Wintle).

EXPLANATION OF PLATE I

Sub fossil Crustaceans

- Fig. 1 *Idolus acuminatus* Herbst Side view of two in complete specimens Natural size Darwin North Australia
- Fig. 2 *Idolus acuminatus* Herbst Side view of an in complete specimen Natural size Darwin, North Australia
- Fig. 3 *Idolus acuminatus* Herbst Side view of hand slightly enlarged Darwin North Australia



A. R. McCulloch, photo,
Austri Mus

EXPLANATION OF PLATE II

Sub-fossil Crustaceans

- Fig. 1 *Squilla serrata*, Forskal. Lower surface of carapace and bases of legs. About two-thirds natural size. New Channel mouth of Brisbane River, Queensland.
- Fig. 2 *Squilla serrata*, Forskal. Lower finger of right hand. Natural size. Derby, Fitzroy River, Western Australia.
- Fig. 3 *Paracyplocus grandispinus*, sp. nov. Upper view of carapace. Natural size. Coode Canal, Yarra River delta, Victoria.



EXPLANATION OF PLATE III

Sub-fossil Crustaceans

- Fig 1 *Sesimulsmithii*, Milne Edwards Carapace and basal joints of legs Slightly reduced Casuarina Island Fitzroy River, Queensland
- Fig 2 *Sesimulsmithii* Milne Edwards Right chela Natural size Casuarina Island, Fitzroy River, Queensland
- Fig 3 *Galathea tasmanica* Herbst Upper view of carapace and cheliped Slightly reduced New Channel mouth of Brisbane River, Queensland
- Fig 4 *Galathea bispinosa*, Herbst Lower view of carapace and cheliped Slightly reduced New Channel, mouth of Brisbane River, Queensland



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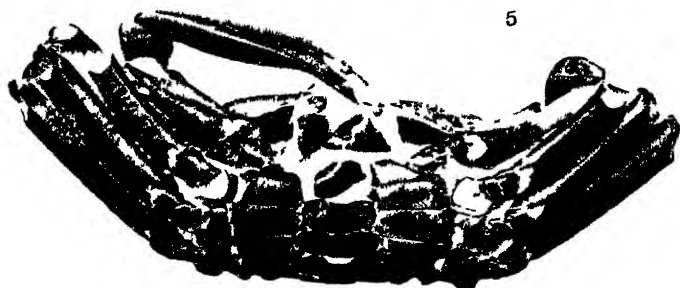


4

EXPLANATION OF PLATE IV

Sub-fossil Crustaceans

- | | | | | | | |
|-------|--------------------------------|---------------|------------|-------------------|--------------------------------------|-----------------------------|
| Fig 1 | <i>Macrophthalmus serratus</i> | Adams & White | Upper view | Slightly reduced | Stradbroke Island | Southern Queensland |
| Fig 2 | <i>Macrophthalmus serratus</i> | Adams & White | Lower view | Slightly reduced | Stradbroke Island | Southern Queensland |
| Fig 3 | <i>Leptophthalmus eripalis</i> | Fabricius | Upper view | Slightly enlarged | New Channel, mouth of Brisbane River | Queensland |
| Fig 4 | <i>Hemiplaia latifrons</i> | Haswell | Upper view | Natural size | Coode Canal | Yarra River delta, Victoria |
| Fig 5 | <i>Hemiplaia latifrons</i> | Haswell | Lower view | Slightly enlarged | Coode Canal | Yarra River delta, Victoria |



EXPLANATION OF PLATE V

Sub-fossil Crustaceans

- | | | |
|-------|---|--|
| Fig 1 | <i>Macrophthalmus depressus</i> Ruppell | Upper view |
| | Natural size | Townsville, Queensland |
| Fig 2 | <i>Macrophthalmus leycasu</i> , Ruppell | Lower view |
| | Natural size | Townsville, Queensland |
| Fig 3 | <i>Podophthalmus ugil</i> , Fabricius | Lower view |
| | About three-fourths natural size | New Channel, mouth of Brisbane River, Queensland |
| Fig 4 | <i>Macrophthalmus setosus</i> , Milne Edwards | Upper view |
| | About one and two-thirds natural size | Newcastle, New South Wales |
| Fig 5 | <i>Macrophthalmus setosus</i> , Milne Edwards | Lower view |
| | About one and two-thirds natural size | Newcastle, New South Wales |

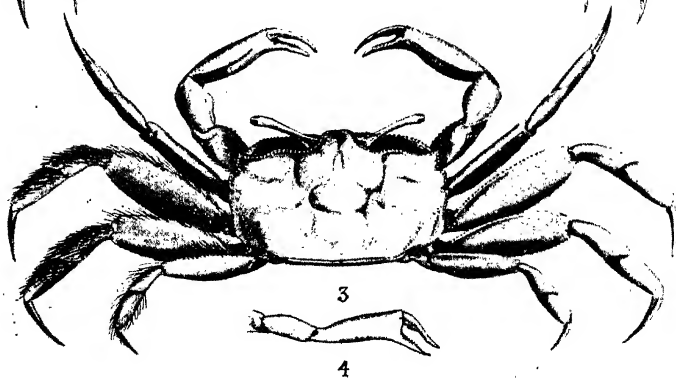
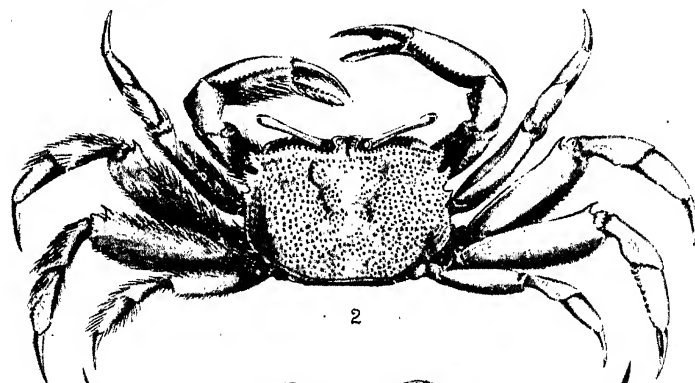
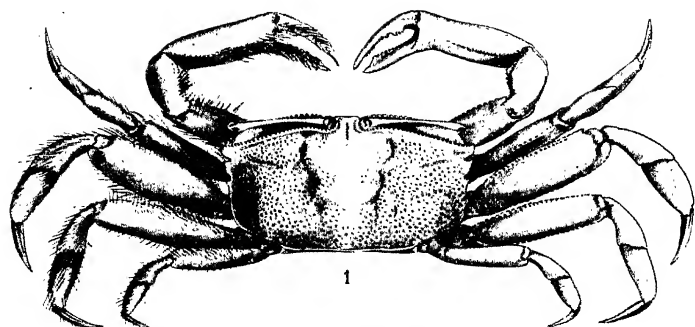


A. R. MCCARTHY, photo.,
Austri Mus.

EXPLANATION OF PLATE VI.

Recent Crustaceans.

- Fig. 1. *Macrophthalmus setosus*, Milne Edwards. Male. Natural size. Parramatta River, New South Wales.
- Fig. 2. *Macrophthalmus depressus*, Rüppell. Male. Natural size. Fremantle, Western Australia.
- Fig. 3. *Hemiplux latifrons*, Haswell. Male. Twice natural size. Victoria.
- Fig. 4. *Hemiplux latifrons*, Haswell. Hand of adult male. Natural size. Tasmania.



EXPLANATION OF PLATE VII

View of Anson Bay, North Australia The fossiliferous bed
is at the base of the low cliff in the centre of the
illustration



H Y L BROWN, photo

A DESCRIPTION OF SOME TASMANIAN SKULLS.

By W. RAMSAY SMITH, M.D., D.Sc., F.R.S. (Edin.).

(Plates viii-xiii.)

I.—INTRODUCTION.

In July, 1910, the Trustees of the Australian Museum, Sydney, were good enough to send me the Tasmanian skulls in their collection for the purposes of measurement and description. The specimens consisted of two complete skulls and the upper portion of a third.

About the same time I was fortunate in obtaining a cast of a skull from the Tasmanian Museum, and also, from another source the skull and most of the bones of an aged Tasmanian woman that had not previously been described. These specimens form the subject of the present contribution.

To Mr. R. Etheridge, Curator of the Australian Museum, I am much indebted for assistance in sending the Museum skulls and giving their origin and history.

These descriptions were written nearly five years ago; but the leisure for putting the necessary finishing touches for publication has been long delayed.

The sagittal contours (Pl. xiii., fig. 2), accompanying the descriptions leave very much to be desired on account of the fragmentary and indefinite characters of some of the specimens and the consequent difficulty in some cases of determining, as a fixed point posteriorly, either the inion or the basion.

B. 3496. AUSTRALIAN MUSEUM.

(Plate viii., figs. 1-2; Plate ix., figs. 1-2).

This is a skull without the lower jaw. It is marked, "Tasmanian from Hobart." The Curator states that it was received from "Professor" T. H. Hume. Part of the right zygomatic arch is wanting. The bones are much polished, as if they had been subjected to a good deal of handling. The lines on them are distinct and the ridges are prominent. It appears to be the skull of an adult male. It weighs 20ozs. 139grs. avoirdupois.

Norma verticalis.—The skull is long. Although the parietal eminences stand out as fairly prominent bosses, the cranial outline is rather oblong or ovoid than pentagonal in form. The triangular area on the frontal bone in front of the bregma, noted by Turner in the specimens he has described, is fairly well marked; and the flattened areas that bound it laterally pass backwards over the coronal suture to the parietals and stop near the posterior part of the parietal eminences. Anteriorly these flattened areas run between the frontal eminences and meet mesially between the glabella and the anterior end of a low broad ridge that runs forwards in the middle line from the bregma. The frontal eminences are well marked and are situated between the flattened areas mentioned above and the temporal curved lines. These curved lines on both sides run backwards and pass below the parietal eminences. Although they are double throughout nearly their whole length in front of and behind the stephanion, only the inferior portion or limb of the ridges seems to be represented. The anterior half of the sagittal suture runs in a narrow groove on a prominent crest, and there is very distinct flattening between it and the parietal eminences on both sides, corresponding with the prolongation backwards of the flattened areas on the frontal bone. The posterior half of the suture (Pl. viii., fig. 1) runs in the gradually widening groove which is depressed in the central part. The maximum widening and depression occur at the obelion. On the postero-lateral part of the right parietal bone there is a flattened area, 50 mm. by 30 mm. in size, due perhaps to injury or some pathological condition. Below the parietal eminences the side walls slope inwards to a minimum diameter of 111 mm., and then outwards to the inferior angle of the

parietal. The maximum transverse diameter, 122 mm., is at the parietal eminences. The asterionic diameter is 113 mm., but the diameter at the most prominent part of the posterior inferior angles, where the parietals articulate with the mastoids, is 115 mm. The stephanic diameter is 97 mm. The zygomatic arches stand out prominently when the skull is viewed from above the vertex at a distance of a metre from the eye. There is only one parietal foramen. It is on the left side, and is of medium size. The suprainial occipital squama bulges considerably; the infrainial portion is very flat.

Norma lateralis.—(Pl. viii., fig. 2). The forehead is fairly rounded. The glabella and superciliary ridges are distinctly marked and confluent, and the ridge on the right side is continuous with the super-orbital border (which is marked by a supra-orbital notch), while on the left side the ridge is imperfectly marked off from the border by a slight groove in which is the supra-orbital foramen. There may thus be said to be a continuous torus supra-orbitalis on both sides. The trigonum on each side is distinct and is slightly rounded, and the external orbital processes are thick. The supra-orbital depressions are shallow. The nasion is only slightly depressed; the internasal suture, measured in a straight line, is 17 mm. long; both nasal bones are of equal width, and measure 7 mm. at their lowest part. The profile outline of the nose is concave, but not greatly so, and the nasal bones form a slight ridge at their sutural junction. The parietal longitudinal arc is the longest, and the frontal and occipital arcs are almost equal in length. The mastoids are not well developed, and the skull rests behind on the posterior margin of the foramen magnum. On the left side there is a large epipteric bone; on the right side there are two. On each side a wedged-shaped wormian bone is inserted between the mastoid and squamous portions of the temporal bone. It may be noted here that on the right side there is a small wormian bone at the inner end of the horizontal suture, between the superior maxilla and the malar, posteriorly. The alisphenoid, at its narrowest part on both sides, measures 12 mm. Its outer surface is concave, but not deeply so. There is no vertical ridge at the junction of this bone with the malar on either side; but on both sides there is a vertical ridge on the temporal bone, from 4 to 6 mm. behind the speno-temporal suture.

Norma facialis.—(Pl. ix., fig. 1). The edge of the maxillary border of the nares, from the level of the lower margins of the nasal bones half-way to the level of the inferior tubinal, is grooved. The floor of the nose seems to be continuous with the incisive region by a smooth area; but closer examination shows that this area is crossed by a fine, thin, sharp, low ridge which runs on each side from the outer margin to the nasal spine, joining the parasternal line before reaching the spine. The nasal spine is distinct, though not large. The anterior nares are fairly wide, the nasal index being 52. The skull is therefore mesorhine, bordering on platyrrhine. The gnathic index, measured by Flower's method, is 104.3. The infra-orbital fossæ are fairly deep and are marked off from the canine fossæ by slight ridges. The incisive fossæ are shallow. The fronto-malar border of the orbit is somewhat thickened. The suture forming the continuation forwards of the infra-orbital canal is patent, and turns inwards behind the margin of the orbit. On the outer wall of the orbit, on both sides, the suture between the sphenoid and the malar runs downwards, courses for a little way along the anterior border of the spheno-maxillary fissure, and passes forwards and inwards on the floor of the orbit to become continuous with the maxillo-malar suture. A sutura verticalis is not present on either side, but on the left side a short suture runs nearly vertically from the orbital margin to an accessory infra-orbital foramen, whence a crack passes downwards and inwards to the borders of the "nasal wall." On the right side there are two accessory infra-orbital foramina, the lowest or normal foramen being separated from the middle one by a distinct ridge. The vertical diameter of the os planum is 11 mm. The orbital index is 85, which makes the skull mesoceme. The inter-orbital width is 22 mm.

Norma basilaris.—(Pl. x., fig. 2). The hard palate index is 123. There are traces of the maxillo-premaxillary sutures. The margins of the anterior palatine fossa are injured; but the fossa appears moderate in size, and is shaped like an isosceles triangle. On the right side of the palate, just in front of the palato-maxillary suture, there is a bridge of bone bounding a foramen. On the left side there are two accessory palatine foramina on the palate bone, a larger antero-external and a smaller postero-internal, separated by a well-marked ridge.

On the right side a similar condition exists. The roof of the palate is 8 mm. above the level of the alveolar borders. The fossæ between the pterygoid plates are shallow. On both sides the vaginal process is free. There is a suture between the basi-occipital and the basi-sphenoid. The posterior condylar fossa on the right side is shallow, and there are two minute foramina in it. The left fossa is still more shallow, and contains one medium-sized foramen. The pharyngeal tubercle is small, but distinct.

Teeth.—The dental arch is rounded in form. The teeth are all absent, but the sockets show well the form of the roots. The series is uninterrupted and regular. The sockets of the incisors, canines, and bicuspidæ are all single. The molar sockets show great regularity; each tooth had possessed two buccal roots and a single large lingual root. The formation of the roots of the wisdoms had not been completed, and probably these teeth had not completely erupted.

The sutures of the skull are well marked; none of them are obliterated at any part. Speaking generally, the coronal and lambdoid are simple, and the sagittal is denticulated. The appearance of a metopic suture is, I think, deceptive.

S. 404. AUSTRALIAN MUSEUM.

(Plate x., figs. 1-2; Plate xi., fig. 1).

This is a skull with the lower jaw. The Curator states that it was received from the Tasmanian Museum. Part of the left zygomatic arch is wanting. Twenty-three teeth are missing from their sockets. Otherwise the skull is in good preservation. It is the specimen referred to by Klaatsch,* as the skull of a female Tasmanian. It may be described as "adult." With the lower jaw it weighs 22oz. avoirdupois.

Norma verticalis.—The skull is ovoid in form, with a tendency to pentagonal. The parietal eminences are full and rounded. The triangular area in front of the bregma is fairly marked and evenly rounded, not ridged. The flattening

— — — — —
*Klaatsch—"The Skull of the Australian Aboriginal," p. 69 *et passim*.

on the parietals between the parietal eminences and the vertical mesial ridge is well marked on both sides, and it extends to the posterior limit of the eminences. The frontal eminences are fairly well marked, and are situated between the flattened boundaries of the triangular area and the temporal curved lines. These lines run across the most prominent parts of the parietal eminences. Both the superior and inferior limbs are represented, and the division takes place far forward on the frontal bone. The sagittal suture runs in a shallow groove, narrow in front, but growing gradually wider towards the lambdoid suture by reason of the separation of the low ridges which mark its lateral boundaries. Apart from this shallow grooving, the region of the obelion is uniformly rounded. The whole of the posterior parietal and asterionic regions is also rounded. The maximum transverse diameter, 136 mm., is between the parietal eminences and the parieto-squamous suture. At the eminences it is 136 mm., and at the parieto-squamous suture it is 135 mm. There is no distinct ridge at the lower angle of the parietal, such as exists in the skull marked B. 3496. The zygomatic arches stand out prominently when the vertex of the skull is viewed at a distance of a metre from the eye. There is only one parietal foramen. It is on the right side, and it is small in size. Apart from a slight bulging of the supra-inial portion immediately behind the lambdoid suture, the whole of the occipital bone is fairly uniformly rounded.

Norma lateralis.—(Pl. x., fig. 1.) The forehead is flattened above the glabella. The glabella and superciliary ridges are confluent, and are marked off from the supra-orbital border by a wide, shallow groove. The trigonum on each side is distinct, and the external orbital processes are thick. The supra-orbital depressions are shallow. The nasion is deeply and acutely depressed. The internasal suture, measured in a straight line, is 12 mm. long. The left nasal bone is 6 mm. wide at its inferior margin; the right, which is imperfect, had been 9 mm. wide. The profile outline of the nose is concave. The bones do not form a ridge at their sutural junction. The frontal longitudinal arc of the skull is the longest, and the parietal is next to it, the occipital being much the shortest. The mastoids are not well developed. The skull rests on the teeth and the occipital condyles. On the left side there is a

long epipteric bone, imperfectly cut off from the parietal; on the right side the four bones at the pterion meet at a point. On the right side a wedged-shaped wormian bone is inserted between the mastoid and the squamous portion of the temporal. On both sides the root of the zygomatic arch extends backwards and upwards on the temporal bone, forming a distinct ridge as far as the posterior limit of the bone. The wing of the sphenoid is small and narrow, measuring only about 9 mm. in width at the narrowest portion. It is very deeply excavated. The spheno-malar suture on both sides is on a raised, roughened sharp ridge. On the left side the spheno-temporal suture is on a small ridge. On the right side the sphenoid and temporal bones have sprung away from each other, but there seems to be a slight ridge at the lower part of the suture. On the left side the infra-temporal crest is scarcely perceptible; on the right side it is represented by a thin, sharp ridge running only partly across the bone, and in a direction more diagonal than usual. On each side the tuberculum spinosum is a small, thin, flat projection.

Norma facialis.—(Pl x., fig. 2). The condition of the floor of the nose is similar to that in the former skull. A thin, sharp ridge, the crista prænasalis of Klaatsch, double or grooved on the right side, runs from the outer margin to the nasal spine, joining the parasternal line before reaching the spine. As in the former skull, this condition is better marked on the right side. The spine is distinct, though not large. The anterior nares are pear-shaped; the nasal index is 58.1. The gnathic index by Flower's method is 98.9. The infra-orbital fossæ are abnormally deep. The canine and incisive fossæ are scarcely at all marked. The fronto-malar border of the orbit is somewhat thickened. In both orbits the suture forming the continuation forwards of the infra-orbital canal turns inwards behind the margin of the orbit, as in the other skull. As in the other skull also, on the outer wall of the orbit, the suture between the sphenoid and the malar runs downwards, courses for a little way along the anterior border of the spheno-maxillary fissure, and passes forwards and inwards on the floor of the orbit to become continuous with the maxillo-malar suture. In the right orbit of this second skull there is a sutura verticalis which runs from the anterior extremity of the suture from the infra-orbital canal across the orbital margin to an accessory infra-orbital foramen above

and internal to the normal foramen. This accessory foramen is not visible in the direct facial view. The vertical diameter of the os planum is 11 mm. The orbital index is 71.7. The orbits appear square-shaped. The inter-orbital width is 18 mm.

Normabasilaris.—(Pl. xi, fig 1.) The hard palate index is 107. There are traces of the maxillo-premaxillary sutures—more marked than in the former skull. The anterior palatine fossae are elongated and narrow. The fossae between the pterygoid plates are very deep. On both sides the vaginal process is free. The posterior condylar fossa on the right side is deep and contains a fairly large foramen. There is no fossa on the left side; but there are two small foramina behind the condyle. The pharyngeal tubercle is not marked. The basi-occipital and basi-sphenoid are firmly united. There is a foramen pterygo-spinosum, the foramen in the external pterygoid plate being 7 mm. in diameter. The middle of the arch of bone bounding the foramen shows the remains of a suture between the two elements. The tympanic bones are small and incomplete.

Teeth.—The dental arch in this skull is much more elongated than in the other. The series of teeth is uninterrupted and regular. There are seven teeth present in the upper jaw. The first right bicuspid is but slightly worn. The first molars are considerably worn; the second molars only slightly. The right wisdom has come nearly into position; it looks downwards and outwards. The left wisdom is erupting; it looks downwards, much outwards, and slightly forwards. The measurements of the teeth, in millimeters, are as follows:—

		Antero-posterior diameter.	Transverse diameter.
1st premolar, right, upper	..	8	10
1st ,, left, lower	..	7	9
1st molar right, upper	..	11	11
1st ,, left, ,,	..	11	12
2nd ,, right, ,,	..	9	11
2nd ,, left, ,,	..	10	12
3rd ,, right, ,,	..	10	10
3rd ,, left ,,	...	10	10

On the right side there are two accessory palatine foramina on the palate bone, a larger antero-external and a smaller postero-internal, separated by a well-marked ridge of bone. On the left side there is one accessory foramen. The roof of the palate is 9 mm. above the level of the alveolar borders.

The sutures of the skull are well marked; none of them are obliterated in any part. The coronal is simple. The sagittal also is simple except for some denticulation. The lambdoid is partly denticulated or serrated; the left limb has one wormian bone in it; the right has two. There is a short much denticulated metopic suture.

1254. AUSTRALIAN MUSEUM.

(Plate xi., fig. 2).

This specimen consists of the upper portion of a skull. It is known to be Tasmanian, but the Curator does not know from whom it was received. The bones composing it are the frontal, the parietals, part of the occipital, and the squamous portion of the right temporal. The sutures are nearly all obliterated. The posterior portion is considerably weathered.

Norma verticalis.—The skull is long, and is ovoid in outline. The triangular area in front of the bregma is fairly well marked, and the flattened areas that bound it pass backwards to near the posterior boundaries of the parietal eminences. Anteriorly, they appear to stop at the level of the frontal eminences, and they are separated from each other by the rather wide and rounded medial ridge that runs forwards towards, but does not reach, the glabella. The frontal eminences are well defined, the outer margins being about 15 mm. from the temporal curved lines. These lines run backwards, and pass just above the most prominent parts of the parietal eminences. The sagittal suture is in a shallow groove on a well-marked medial ridge, and the groove widens out as it runs backwards, after the fashion described in the former skulls. Below the eminences the lateral walls are almost perpendicular; if anything, they bulge slightly. The maximum transverse diameter is about midway between the parietal eminences and the parieto-squamous sutures. The

zygomatic arches would have been easily visible when the skull was viewed from above in the usual fashion. On account of the amount of destruction of the outer table at the back of the skull, it is not possible to say whether any parietal foramen had been present. The supra-inial occipital squama bulges slightly.

Norma lateralis.—(Pl. xi., fig. 2). The forehead is rounded. The glabella and superciliary ridges are confluent. The ridges are marked off from the supra-orbital borders by well-marked grooves. At the inner part of the right groove is the supra-orbital foramen; on the left side there is a supra-orbital notch. The trigonum on the left side is flattened; on the right side it is rounded. The supra-orbital depressions are shallow. The nasion is somewhat sharply, but not deeply, depressed. It is difficult to state the exact lengths of the frontal and parietal arcs on account of the undefined position of the bregma.

There is a short, much-serrated metopic suture.

1826. CAST OF TASMANIAN SKULL (PRIVATE
COLLECTION).

This is a piece of particularly fine workmanship by Mr. Alfred J. Taylor, and shows very well the leading features and many of the finer details of the skull.

Norma verticalis.—The skull is long, and on account of the projection of the parietal eminences it shows a distinctly pentagonal outline. The triangular area in front of the bregma is fairly well marked, and the flattened areas on the frontal and parietal bones are very distinct. Posteriorly, they extend some distance behind the parietal eminences. Anteriorly, they run forwards between the frontal eminences, and meet mesially between the glabella and the anterior end of the rounded ridge that runs forwards in the middle line from the bregma. The frontal eminences are fairly marked between the flattened areas and the temporal curved lines. These

lines pass backwards over the most prominent part of the parietal eminences. The anterior part of the sagittal suture runs in a narrow groove on the median crest. The groove in this skull widens out posteriorly to a slight extent. One might say that the crest becomes somewhat flattened in the region of the obelion.

Norma lateralis.—The forehead is flattened. The glabella is not well marked, but the superciliary ridges are large and stand out like nodular masses. They are separated from the supra-orbital borders by shallow, indistinct grooves. On each side the trigonum is flattened, but the external orbital processes are thick. The supra-orbital depressions are well marked. The nasion is deeply depressed; the inter-nasal suture, measured in a straight line, is 11 mm. long. The profile outline of the nose is slightly concave, and the nasal bones form a slight ridge at their sutural junction. The frontal arc is 130 mm long; the parietal is 120 mm. The length of the occipital cannot be determined.

Norma facialis.—The nasal spine is distinct, though not large. The nares are fairly wide, the index being 57.4. The infra-orbital fossæ are very deep. The fronto-malar border of the orbit is thickened and rounded. The orbital index is 73.8.

The sutures are well marked. None of them are obliterated at any part. The coronal is simple; the lambdoid is partly denticulated; and the sagittal is denticulated in its whole length.

1665. PRIVATE COLLECTION.

(Plate xii., figs. 1-2; Plate xiii., fig. 1.)

This is the skull and lower jaw of an aged female. Part of the right zygomatic arch is wanting, and also a portion of the

right parietal bone, and the teeth are imperfect. Otherwise the skull is complete.

Norma verticalis.—The skull is long, and ovoid in outline, inclining, however, to the pentagonal shape on the right side. The triangular area in front of the bregma is not well marked, the frontal bone being on the whole uniformly rounded. The frontal eminences are well marked. Between the right eminence and the right limb of the coronal suture there is an oval dent 22 mm. by 15 mm. in size. The temporal curved lines run backwards over the most prominent parts of the parietal eminences. From the stephanion backwards they are distinctly double. The anterior half of the sagittal suture runs in a narrow groove on the top of a crest, which becomes distinct about 2 cm. behind the bregma. Between the ridge and the parietal eminence on each side is a characteristic flattened area. The flattening stops at about the level of the posterior part of the eminence. The posterior half of the sagittal suture runs in the gradually widening groove, which is more depressed in its central part. The maximum widening and depression occur at the obelion. Below the parietal eminences the walls slope slightly outwards. The zygomatic arches stand out prominently when the skull is viewed from above at a distance of a metre from the eye. There are two parietal foramina. The supra-inial occipital squama is rounded, but not bulging, and the infra-inial portion is flattened or only slightly rounded.

Norma lateralis.—(Pl. xii., fig. 1). The forehead is rounded. The glabella and superciliary ridges are well marked and confluent. On each side a shallow groove running outwards from the supra-orbital notch separates them from the orbital margins. The right orbital margin is more rounded than the left. The trigonum on each side is flat; the external orbital processes are thick. The supra-orbital depressions are shallow. The nasion is only slightly depressed; the inter-nasal suture, measured in a straight line, is 16 mm. long. Both nasal bones are of equal width, and measure 8 mm. at the lowest part. The profile outline of the nose is markedly concave, and the nasal bones form a distinct ridge at their sutural junction. The frontal longitudinal arc is the longest, and the parietal next in length. The mastoids are not well developed, and

the skull rests behind on the posterior margin of the foramen magnum. The alisphenoid, at its narrowest part on both sides, measures 16 mm. The outer surface is markedly concave. The suture between the alisphenoid and the temporal on each side is on a prominent ridge. On the left side there is a vertical ridge at some distance behind the junction of the malar with the alisphenoid.

Norma facialis.—(Pl. xii., fig. 2). On the right side the floor of the nose appears at first sight to be continuous with the incisive region by a smooth area, but a closer examination shows that this area is crossed by a thin, rounded, low ridge, which runs from the outer margin to the nasal spine, joining the parasternal line before reaching the spine. Further, the maxillary border of this side does not lose itself on the incisive region, as it appears to do on superficial inspection, but curves inwards and upwards, and reaches the nasal spine 5 mm. from its most anterior point. On the left side the maxillary border has a similar course. The parasternal line in the form of a distinct ridge, runs backwards, outwards, and upwards to come into very close relation to the maxillary border. There is no appearance on this side of a ridge corresponding to the thin, low ridge present on the right side. The nasal spine is distinct, though not large. The septum is deflected to the left side. The anterior nares are fairly wide, the nasal index being 57.4. The gnathic index measured by Flower's method is 106.5. The infra-orbital fossæ are very deep. A suture verticalis is not present on either side. On the right side there is a small accessory infra-orbital foramen, not in the position usual for such a foramen, but below, instead of above, the normal one. This foramen is continuous with a depression passing transversely inwards and becoming continuous with a foramen in the wall of the antrum. The vertical diameter of the os planum appears to be 9 mm., but the superior border is difficult to determine on either side. The orbital index is 73.8; the interorbital width is 17 mm.

Norma basilaris.—(Pl. xiii., fig. 1). The hard palate index is 110. The sutures of the palate are all obliterated. The anterior palatine fossa is rounded in form; its posterior margin is bounded by a large knob-like projection which forms the

anterior termination of a rounded median ridge 16 mm long. There are two accessory posterior palatine foramina on each side, those on the right side being larger than those on the left. The fossæ between the pterygoid plates are shallow. On each side a lower anterior portion is cut off from the rest by a vertical septum. The vaginal process is not free on either side.

The posterior condylar fossa on each side is shallow. On the right side there is a small foramen. The pharyngeal tubercle is not marked. On the anterior margin of the foramen magnum a "third condyle" is represented by a concave depression, the long or transverse diameter measuring 11 mm, and the short or antero-posterior being 3 mm.

Teeth—The alveolar border is "arched" in form, the posterior portions being somewhat elongated. The teeth present are the lateral incisors, the canines, the second bicuspids, and the first right molar. The two incisors and the right canine are hollowed out by caries, the others are more or less worn. Apparently there was a gap between the central incisors. The right central had occupied the same socket as the right lateral. There is no trace of the wisdoms. The measurements of the teeth in millimeters are as follows:—

	Antero-posterior Diameter	Transverse Diameter
Canine left	8	
2nd bicuspid right	8	
left	4	
1st molar, right	13	

The five remaining teeth are too imperfect to give accurate measurements. The bicuspids on both sides appear to have been abnormal.

The roof of the palate is 8 mm above the level of the alveolar borders.

The sutures of the cranium are all obliterated except the parieto-squamous, the outer parts of the lambdoid, and the part of the sagittal between the bregma and the obelion.

Collection Number		A	B	C	D	E
		Australian Museum B 896	Australian Museum S 40	Australian Museum 1254	Private Coll. N ^o 6	Private Collection 1966
Age Sex		Adult Male	Adult Female	Adult ?	Adult Male	Aged Female
Glabell. occipital length		184	179	189	189	177
Basi-bregmatic height		130	131			120
Vertical Index		70.6	71.8			67.7
Maximum frontal width		99	104	110	105	102
Minimum frontal diameter		91	91	92	89	91
Staphenic diameter		97	91	102	101	100
Asterionic diameter		113	109	111	106	100
Greatest parieto-squamous breadth		122 p	136 p	131 p	110 p	130 p
Cephalic Index		66.3	75.9	61.3	74	73.4
Horizontal circumference		50	50.5	52.2	51.2	48.7
Frontal longitudinal arc		121	127		130	120
Parietal		123	123		120	114
Occipital		120	110			111
Total		370	60			355
Vertical transverse arc		270	286		297	276
Maximum bi-mastoid diameter		111	121		122	116
Vertical transverse circumference		391	123			405
Length of foramen magnum		32	36			35
Width of foramen magnum		27	32			29
Basi-nasal length		96	92			92
Basi-zygomatic length		92	91			98
Gnathic Index		95.8	98.9			108.5
Total longitudinal circumference		557	510			548
Inter-zygomatic breadth		111	120		130	113
Nasio-mental length			100			96
Nasio-alveolar length		55	55			60
Nasal height		48	43		51	47
Nasal width		25	25		26	27
Nasal Index		52.1	58.1		50.9	57.1
Orbital width		10	39		11	42
Orbital height		34	28		27	31
Inter-orbital width		22	19			18
Orbital Index		85	71.7		61.3	73.8
Palato-maxillary length		52	57			60
Palato-maxillary breadth		61	61			66
Palato-maxillary Index		123	107			110
Lower Jaw	Symphysial height		30			25
	Coronoid		59			50
	Condylod		60			50
	Gonio-symphysial length		88			85
	Intergonial width		99			88
Breadth of ascending ramus			30			28

OCCASIONAL NOTES.

No. I.

ANTIQUITY OF MAN IN AUSTRALIA.

In 1890 there appeared a short paper by myself, "Has Man a Geological History in Australia?"¹ being an analysis of the statements relative to the supposed discovery of human teeth in the Wellington Cave bone-deposits by Mr. Gerard Krefft. That teeth were found appeared to be an established fact, but that these were taken from the *bona-fide* bone-breccia did not then appear to be satisfactorily decided, hence the conclusion of "not proven" arrived at.

Two other points, however, were unknown to me at the time I wrote. The first was that Krefft had figured one of the molar teeth, and the second that at the time of his severance from the Museum, or thereabouts, he had a work in preparation on our Post-Tertiary Mammals, which apparently was to be called "Australian Fossil Remains."

In 1882 there appeared in the published "Votes and Proceedings of the Legislative Assembly" a parliamentary paper, "Exploration of the Caves and Rivers of New South Wales,"² to which were attached a number of plates of Wellington Cave fossils; some of these were photographic reproductions (thirteen plates), the remainder lithographs, numbered Plates 1 to 18. Figs. 3 and 4 of Pl. 12 are two views of a human molar tooth.

The explanations of these lithographic plates, accompanied by a number of disjointed notes, are amongst the Krefft MSS. now preserved in the Mitchell Library. With the view of endeavouring to recognise as many as possible of the original specimens in the Museum Collection, Mr. W. W. Thorpe spent some days at the Library, and through the courtesy of Mr. H. Wright, the Librarian, was able to transcribe copious extracts. The two most important points revealed were the following:—In the explanation of Plate 12, we read in *Krefft's own handwriting*—"Figs. 3 and 4. Side view, natural size, and view from above enlarged of a human molar tooth, taken from the solid breccia of Wellington Cave by the writer."³

¹ Proc. Linn. Soc. N.S. Wales, v., pt. 2., 1890, p. 259.

² Votes and Proceedings of the Legislative Assembly, Sydney, v., 1882, p.p. 551-602.

³ The italics are mine.

Next, attached to one of these documents (A263) is what appears to be a small plan of the work going on at the caves under Krefft's supervision, but possibly prepared by the workman in charge, giving depths and details. As a footnote to this plan occurs the following remark:—"In well-hole where Krefft found human skeleton in red breccia."

Now, (1) from the evidence I collected at the time I previously wrote on this subject, I arrived at the conclusion that the teeth in question were discovered on the present-day floor of a cave, but we are now faced with Krefft's written statement that these teeth were taken by himself from the breccia *in situ*; (2) from the brief information on the face of this MS. plan (and there appears to be no question of its genuineness), it would appear that Mr. Krefft did find, at some time during the exploration of the Wellington Caves, the work being then under his control, not only the teeth, but a human skeleton therein also.

The occurrence of the molar teeth in the breccia may render a modification in the former verdict of "not proven" necessary, but little deduction can be derived from the skeleton occurrence until further evidence is forthcoming of its precise position in the cave deposit.

R. ETHERIDGE.

EXPLANATION OF PLATE VIII

Tasmanian Adult Male Skull

Fig 1 *Norma verticalis*

Fig 2 , *lateralis*



EXPLANATION OF PLATE IX

Tasmanian Adult Male Skull

Fig. 1. *Norma facialis*
 , *basilaris*



EXPLANATION OF PLATE X

Tasmanian Adult Female Skull

Fig. 1 *Norma lateralis*

Fig. 2 , *facialis*



EXPIANATION OF PLATE XI

—

Tasmanian Female Skull

Fig 1 *Norma basilaris*

Tasmanian Skull (upper portion)

Fig 2 *Norma lateralis*



W. RAMSAY SMITH photo

EXPLANATION OF PLATE XII

Tasmanian Aged Female Skull

Fig 1 *Norma lateralis*

Fig 2 „ *frontalis*

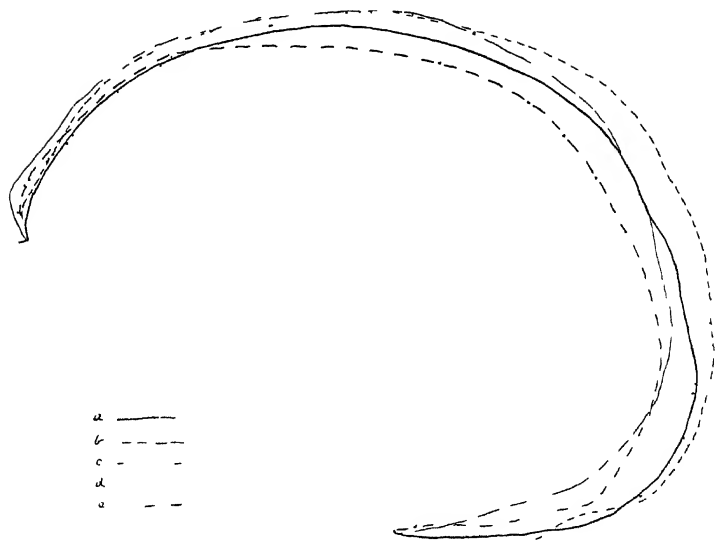
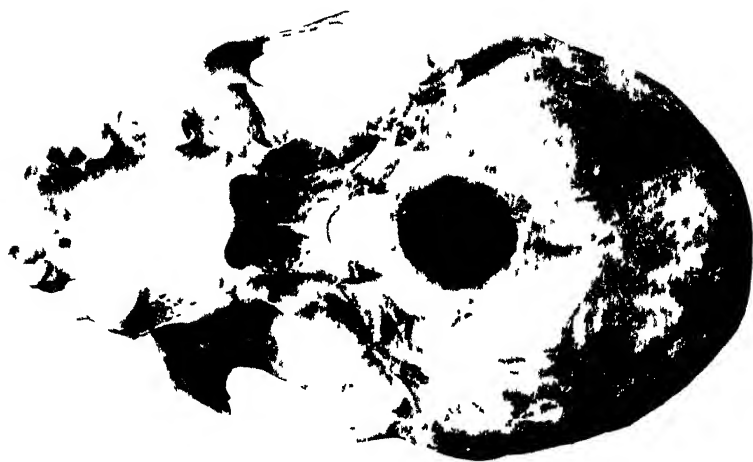


EXPLANATION OF PLATE XIII

—

Tasmanian Aged Female Skull

- Fig 1 *Norma basilaris*
Fig 2 Sagittal Contours from nasion to basion
(a) Australian Museum, B 3496
(b) Australian Museum, S 404
(c) Australian Museum, 1254
(d) Private Collection, 1826
(e) Private Collection, 1665



ERRATUM.

PAGE 1. SAHO. HANDE. AND MAY. NOT. VARIOUS

ARACHNIDA FROM NORTHERN QUEENSLAND.

Part I.

By W. J. RAINBOW, Entomologist

(Plates 14, 15, 16.)

The material enumerated hereunder was collected by Mr. A. A. Girault in Northern Queensland. By far the greater bulk of the species was collected in the vicinity of Gordonvale, formerly known as Nelson. The Spiders are mostly small, and of the arboreal type. This is what one would naturally expect when the methods of collecting adopted by Mr. Girault are considered, namely, "beating" and "sweeping." There are, however, as will be seen by a perusal of the contents of this paper, a few terrestrial forms.

In such a mass of material as that collected by Mr. Girault, and from a district so rich in individuals and species, it is only natural that some novelties should occur, and so we find it. These, which include new genera and new species, are in addition to already recorded forms enumerated below. The "Girault Collection," as this material may be called, include one *Isometroides*, one *Chelifer*, one *Dugesiopetrus*, one *Trombidium* and one *Rhincolophus*, all of which are recorded in their proper place.

Order SCORPIONIDÆ.

Family ANDROCTONOIDÆ.

Genus *Isometroides*, Keys.

ISOMETROIDES VESCUS, Karsch.

Isometrus vescus, Karsch., Schrift. Ges. naturf. Freund. Berlin, 1880, p. 56.

Isometroides vescus, Keys., Die Arach. Austr., Suppl., 1884, p. 17, pl. 2, figs. 3, 3a.

Hub.—Gordonvale (Nelson, viâ Cairns), under bark of "Bastard" or "Poplin Gum," August 28, 1912.

Order CHELONETHIDÆ.

Family CHELIFERIDÆ.

Genus *Chelifer*, Geoffr.*CHELIFER BREVIDIGITATUS*, Keys.

Chelifer brevidigitatus, Keys., Die Arach. Austr., Suppl., 1884, p. 48, pl. 4. figs. 6 to 6c.

Hab.—Hughenden, July 13, 1912, on "Sword grass."

Order OPILIONIDÆ.

Family DAMPETRIDÆ.

Genus *Dampetrus*, Karsch.*DAMPETRUS TUBERCULATUS*, Sor.

Dampetrus tuberculatus, Sor., Die Arach. Austr., Suppl., 1886, p. 82.

Hab.—Gordonvale; forest, under logs, May 20, 1912.

Order ARANEIDÆ.

Family AVICULARIDÆ.

Sub-family DIPLURINÆ.

Genus *Chenistonia*, Hogg.*CHENISTONIA GIRAULTI*, Rainb.

Chenistonia giraulti, Rainb., Rec. Austr. Mus., x., No. 8, 1914, pp. 243-7, figs. 52-57.

Hab.—Gordonvale; forest, under logs, May 20, 1912.

Family ULOBORIDÆ.

Sub-family ULOBORINÆ.

Genus *Uloborus*, Latr.*ULOBORUS GENICULATUS*, Oliv.

Uloborus geniculatus, Oliv., Encyl. Méthod. cet. ii., 1789, p. 214.

Uloborus zosis, Walck., Hist. Nat. Ins., Apt., ii., 1837, p. 231, Atlas, pl. 20, figs. 2A-2D; L. Koch, Die Arach. Austr., i., 1871, p. 221, pl. xix., figs. 3-3e; Thor., Studi Rag. Mal. e Pap., ii., 1878, pp. 129 and 290; *Op. cit.*, iii., 1881, p. 158; *Op. cit.*, Parte iv., 1890, p. 239.

Hab.—Cairns, November 10, 1912, in stables; May 1, 1913, in rooms of an unoccupied dwelling; August 7, 1913, in laboratory. A very common species. It occurs also in India, Burma, Malaysia, Papua and South Sea Islands.

ULOBORUS VARIABILIS, *Keys.*

Uloborus variabilis, *Keys.*, Die Arach. Austr., Suppl., 1887, p. 231, pl. xx, figs. 9-9e.

Hab.—Specimen with four egg-sacs on bank of streamlet; forest, Gordonvale, April 27, 1913; immature specimens, jungle, Gordonvale, May 25, 1913; same locality, March 30, and April 2, 1914; Pentland, September, 1914. The cocoons are similar to those of *U. republicanus*, Sim.¹

ULOBORUS BARBIPES, *L. Koch.*

Uloborus barbipes, L. Koch, Die Arach. Austr., i., 1871, p. 229, pl. xix., figs. 9 and 9a.

Hab.—Gordonvale, May 1, 1912; Pentland, September 9, 1914.

Sub-family MIAGRAMMOPINÆ.

Genus *Miagrammopes*, *O. P. Cambr.*

MIAGRAMMOPES BRADLEYI, *O. P. Cambr.*

Miagrammopes bradleyi, *O. P. Cambr.*, Ann. Mag. Nat. Hist., xiv. (4), 1874, p. 177.

Hab.—Two specimens, each from Gordonvale, taken by sweeping; one on May 25, 1913, and the other on March 2, 1914. In my "Census of Australian Araneidæ" the *habitat* is given as "Sydney, N.S. Wales"; it should read, "N. Australia."²

¹ See pl. 4, Vol. ix., Ann. Soc. Entom. France, 1891.

² Rainbow—Rec. Austr. Mus., ix., 2, 1911.

MAGRAMMOPES FASCIATA, *sp. nov.*

(Plate xiv., fig. 1.)

♀ Cephalothorax, 1.8 mm. long, 1 mm. broad; abdomen, 3.5 mm. long, 1.3 mm. broad.

Cephalothorax.—Oblong, olive-green, almost parallel-sided. *Pars cephalica* rather flat, obtusely truncated in front, sides slightly rounded. *Pars thoracica* long, narrow, flat and somewhat uneven above, level with *pars cephalica*, sides somewhat rounded, posterior angle obtusely truncated. *Marginal band* yellowish, broad, rounded. *Eyes*.—Eight. Those constituting the rear row form a slightly recurved line; each lateral eye of this row is separated from its neighbour by a space equal to twice its individual diameter; the median eyes are, again, separated from each other by a space equal to fully four times its individual diameter; anterior eyes exceedingly minute, and difficult to detect; they are arranged in pairs; each pair is situated immediately in front of the posterior median eyes, are placed obliquely, and nearly touch each other; each lateral eye of the posterior row is removed from its minute anterior neighbours by a space equal to fully once its own individual diameter (Fig. 1.) *Legs*.—Unequal in length; first pair much the longest and strongest. Relative lengths: 1, 4, 2, 3. First pair olive-green above, sides and underneath dull yellowish; the other pairs pale yellow. *Oculumistrum* prominent. *Palpi*.—Yellow, short, hairy. *Palpes*.—Concolorous, short, weak, porrected. *Maxillae*.—Dull yellow, rather long, moderately strong, almost parallel, inclining inwards; apices obliquely rounded. *Labium*.—Concolorous, somewhat coniform. *Sternum*.—Concolorous also, elongate, narrow, arched, and furnished with a few rather long hairs. *Abdomen*.—Cylindrical, not overhanging base of cephalothorax; upper surface dark olive-green, relieved by six large, yellow spots, arranged in pairs; sides concolorous, relieved by large yellow patches; inferior surface pale yellow, reticulated with a tracery of fine dark olive-green. *Spinnerets*.—Normal.

Hab.—Gordonvale jungle, "sweeping"; one specimen in June, 1913 (type) and one, immature and broken, June, 1914.

Family DICTYNIDÆ.

Genus Amaurobius, C. Koch.

AMAUROBIUS CHALYBEIUS, L. Koch.

Amaurobius chalybeius, L. Koch, Die Arach. Austr., i., 1872, p. 328, pl. xxvi., figs. 4-4b.

Hab.—Gordonvale forest, "sweeping," April 27, 1913. Ranges from North Queensland to W. Australia.

AMAUROBIUS SENILIS, L. Koch.

Amaurobius senilis, L. Koch, Die Arach. Austr., i., 1872, pl. xxvi., figs. 3, 3a.

Hab.—Hughenden, among "Sword grass," July 13, 1912.

AMAUROBIUS SCALARIS, L. Koch.

Amaurobius scalaris, L. Koch, Die Arach. Austr., i., 1872, p. 334, pl. xxvi., figs. 7, 7a; *loc. cit.*, p. 337.

Hab.—Gordonvale, jungle, May 29, 1914.

Genus Aphycotoschæma, Simon.

APHYCOTOSCHÆMA MACULATA, sp. nov.

(Plate xiv., figs. 2, 3, and 4.)

♀ Cephalothorax 1.5 mm. long, 1 mm. broad; abdomen, 2.4 mm. long, 1.5 mm. broad (Fig. 2).

Cephalothorax.—Ovate, shining, mahogany brown. *Pars cephalica* raised, arched, smooth; *ocular area* broader than long; *clypeus* deep, furnished with two or three short bristles. *Pars thoracica* smooth, arched, shining, normal grooves distinct; *median fovea* longitudinal; *marginal band* broad. *Eyes*.—Nearly equal in size, in two rows of four each, large; anterior row straight on its front line; rear row strongly procurved; front median eyes separated from each other by a space equal to once their individual diameter; rear median eyes separated from each other by a space equal to twice their individual diameter; lateral eyes oblique, nearly touching; each pair linked together upon a black *tuberculum*; rear median eyes separated from their anterior median neighbours

by a space equal to once their individual diameter (Fig. 3). *Legs*.—Not long, moderately strong, yellow, annulated with brown rings; all ambulatory limbs armed with long, fairly strong spines; the latter are longest and strongest upon the metatarsi—at any rate insofar as the second, third and fourth pairs are concerned; unfortunately each anterior leg has lost all joints below the *patella*. *Palpi*.—Long, yellow, not annulated; hairy, and similarly armed to legs. *Palces*.—Slightly projecting, concolorous with cephalothorax, clothed with long, coarse hairs or bristles, apices divergent; inner angle of the furrow of each falx armed with two small teeth, of which the one nearest the fang is the smaller. *Maxillæ*.—Yellow-brown, inner angles pale yellow, moderately long, arched, apices inclined inwards and obtuse; a few long, bristly hairs distributed over the surface. *Labium*.—Concolorous, rather longer than broad, parallel-sided, apex truncated, but slightly depressed at centre. *Sternum*.—Concolorous with cephalothorax, broad, smooth, shining, slightly arched, anterior angle truncated, apex acuminate, and terminated between posterior coxæ. *Abdomen*.—Large, ovate, slightly overhanging base of cephalothorax, strongly arched, pubescent, superior surface and sides cinerous, relieved by a series of slightly darker patches and markings (Fig. 2); inferior surface concolorous, with three slightly darker median, longitudinal stripes, extending from *epigastric fold* to near *cribellum*, which latter is *bipartite*. *Epigynum*.—Large, raised, arched, shining brown with an undulating lip overhanging a deep cavity (Fig. 4).

Hab.—Gordonvale, forest, May 9, 1913.

Family SICARIIDÆ.

Sub-family SCYTODINÆ.

Genus *Scytodes*, Latr.

SCYTODES PENICILLATA, sp. nov.

(Plate xiv., figs. 5, 6 and 7).

♀ Cephalothorax, 4.2 mm. long, 3.5 mm. broad; abdomen, 5.7 mm. long, 3.5 mm. broad.

Cephalothorax.—Yellow, with dark pencillings, subglobose, narrowest in front. *Pars cephalica* strongly arched, smooth, sloping forward precipitately to near region of anterior eyes, from whence it gradually ascends towards *clypeus*, which latter

is truncated, steep and indented in front; *ocular area* broader than long. *Pars thoracica* high, strongly arched, sloping abruptly at rear; *marginal band* broad, yellow, mottled with dark brown (Fig. 5). *Eyes*.—Six, arranged in pairs; each lateral pair prominent, raised upon a tubercle and widely removed from the other; the eyes of each pair closely in contact with each other. *Legs*.—Long, slender, pale yellow, spotted with dark brown and sparingly clothed with short hairs; patellæ broadly ringed with dark brown: each tibia has also a ring of dark brown near to junction of metatarsus. *Palpi*.—Short, yellow, hairy. *Falces*.—Weak, short, slightly projecting, pale yellow with dark brown pencilling; *fang* very short, weak. *Maxillæ*.—Short, yellow, outer angles dark brown; broad at base, tapering rapidly towards apices which are bluntly acuminate, and incline inwards; inner angles straight. *Labium*.—Dark brown, coniform. *Sternum*.—Shield-shaped, truncated in front, and acuminate at posterior extremity, which latter terminates between fourth pair of coxæ; surface dark brown with a broad yellow patch in front, and another of a somewhat leaf-like design at the centre; these patches are connected by a narrow yellow line which suggests the stalk of the leaf; there are also six moderately large and prominent *sigilla*, and these are marginal. *Abdomen*.—Ovate, strongly arched, slightly abutting on to base of cephalothorax, dull yellow, with dark brown pencillings upon superior surface and sides; under side dull yellow also with a few scattered, dark spots (Fig. 6). *Epigynum*.—Large, dark brown, and forming two elongate plaques, each of which are surrounded with long, fine hairs (Fig. 7).

Hab.—Goondi, taken from window of residence, July 25, 1912. Eggs in small ball carried by fangs

Family DYSDERIDÆ.

Sub-family SEGESTRINÆ.

Genus *Ariadna*, Aud. in Sav.

ARIADNA ? OCTOSPINATA, Lamb.

Ariadna ? octospinata, Lamb, Ann. Queensl. Mus., 10, 1911, p. 169, fig. 1.

Hab.—Pentland. An immature specimen of what I take to be the above species, was collected by Mr. Girault, in September, 1914.

Family DRASSIDÆ.

Sub-family DRASSODINÆ

For the reception of the species described hereunder, I venture to propose a new genus, *Epicharitus*, and this should, I think, be included in Simon's group *Echemec*. It agrees with the group indicated in a number of important details. This group includes several genera that are represented in Australia, but to none of these does it wholly conform. However, the student by comparing the description of *Epicharitus* herein given, with those of genera enumerated and defined by Simon in his great classic, "*Histoire Naturelle des Araignées*," will easily detect in what manner the genus now defined for the first time differs from those already established, and the reasons for incorporating it in the section named.

Genus *Epicharitus*,¹ *gen. nov.*

(Plate xiv., fig. 8.)

Cephalothorax.—Oblong-ovate, narrow, arched. *Pars cephalica* not higher than thoracic segment, obtuse in front; *ocular area* broader than long; *clypeus* narrow, deep. *Pars thoracica*, arched; *median fovea* absent. *Eyes*.—Eight, large, arranged in two rows of four each; front row slightly procurved, the eyes grouped closely together; rear row strongly procurved, the individuals widely separated (Fig. 8). *Legs*.—Moderately long, robust, hairy, spined; metatarsi and tarsi of anterior pair, and tarsi of fourth pair, scopulated; tarsi armed with two claws, and finished with tenent hairs. Relative lengths: 4, 1, 2, 3. *Palpi*.—Moderately long, similar in clothing and armature to legs. *Palces*.—Short, weak; inferior margin of furrow armed with three small teeth, and superior with two; *fang*, short, weak. *Maxilla*.—Long, broad, strongly arched, obtuse, apices inclining inwards; in general appearance somewhat like *Sergiolus*, Sim., but stouter. *Labium*.—Long, narrow, almost straight, apex obtuse; also somewhat like *Sergiolus*, being relatively as long, but broader. *Sternum*.—Elongate,

¹ ἐπιχαρίτος = pleasing.

arched, obtusely attenuated in front and at rear. *Abdomen*.—Elongate, cylindrical. *Spinnerets*.—Elongate, cylindrical, apices truncated, and encircled with well-developed spinnerules.

EPICHRITUS LEUCOSEMUS,¹ sp. nov.

(Plate xiv., figs 9 and 10).

♀ Cephalothorax, 2.3 mm. long, 1.3 mm. broad; abdomen, 2.6 mm. long, 1.3 mm. broad.

Cephalothorax.—Oblong-ovate, smooth, dark-brown (almost black), shining, and when viewed with strong light, displaying coppery reflections; there is a number of short, stiff hairs scattered over the surface; junction of cephalic and thoracic regions not indicated. *Pars cephalica* not higher than thoracic segment, strongly arched, gently sloping forward, obtuse in front; *ocular area* broader than long; *clypeus* narrow, deep, and fringed with long black bristles. *Pars thoracica* strongly arched, sloping gently to posterior angle which is slightly indented; *marginal band* narrow. *Eyes*.—Arranged in two rows of four each; anterior row slightly procurved, and posterior row strongly so. The eyes constituting the anterior row, are grouped together compactly; the median pair are round, and separated from each other by a space equal to half the individual diameter of a median eye; lateral eyes elliptical, placed obliquely, and each close to its median neighbour; rear eyes sensibly smaller than the median front eyes; of this series the outer eyes are slightly smaller than their inner neighbours, from which each lateral eye is removed by a space equal to once its own individual diameter; inner eyes separated from each other by a space equal to four times their own individual diameter; each anterior median eye separated from the posterior median in an oblique line by a space equal to twice its individual diameter (Fig. 8). *Legs*.—Moderately long, robust, concolorous with cephalothorax, clothed with long hairs, and bespined. *Palpi*.—Moderately long, similar in colour and armature to legs. *Furrows*.—Short, very weak; inferior margin of furrow armed with three small teeth, and the superior with two; *fang* short, very weak. *Maxilla*.—Long, stout, concolorous with cephalothorax, arched, sparingly hairy, apices

λευκοσημος = white marked.

obtuse, inclining inwards, and with the inner angles fringed and oblique. *Labium*.—Concolorous also, arched, much longer than broad, coniform, surface sparingly hairy, apex fringed with rather long bristles. *Sternum*.—Concolorous with cephalothorax, and displaying similar metallic reflections, elongate, arched, smooth, anterior and posterior extremities obtuse. *Abdomen*.—Cylindrical, arched, densely clothed with long black and white hair (Fig. 9). At anterior extremity the abdomen is grey, then black; near the centre there is a broad white band which almost completely encircles the animal at that part; the white band is succeeded by a broad patch of black, and this again by a terminal band of white. *Epigynum*.—A transversely oval plaque faintly indicated with two circular, dark-brown, shining depressions (Fig. 10).

Hab.—Gordonvale, sweeping in jungle, May 11, 1913.

(Group SYMPHANODEÆ.

The graceful spider described hereunder presents some features that will be of much interest to students, and these seem to suggest that a new group in the sub-family Drassodinae is essential for its reception and so I propose the name *Symphanodes*. Simon has divided this sub-family into nine well-defined groups, into none of which the form now demanding attention appears to fall. By its spinnerets it somewhat resembles *Megamyrceon*, Reuss., in respect to their truncature, and the well-developed spinnerules; but there the immediate affinity with that genus ends. One of the most striking features of this spider, for which I propose the name *Symphanodes dianiphus* (*gen. et sp. nov.*), is the leg formula, which is 4, 3, 1, 2, whilst in other genera, it is 4, 1, 2, 3. Another exception is that all the metatarsi and tarsi are scopulated, instead of only those of legs i. and iv. as in several genera, or of only that of the first pair in others; and to this must be added the eye formula and the form of maxillæ and labium.

(Genus *Symphanodes*,⁵ *gen. nov.*

(Plate xiv., figs. 11, 12, and 13.)

Cephalothorax.—Oblong-ovate, obtuse in front. *Pars cephalica* moderately raised, arched, sloping to the rear, normal

⁵ συμφανωδης, = harmonious.

grooves defining junction of cephalic and thoracic segments distinct; *ocular area* broader than long; *clypeus* narrow. *Pars thoracica* arched, normal grooves faintly indicated; *median fovea* absent. *Eyes*.—Eight; in two rows of four each; rows slightly procurved (Fig. 11). *Legs*.—Short, robust, bespined; metatarsi and tarsi scopulated. *Claws*, 2. Relative lengths: 4, 3, 1, 2. *Palpi*.—Short, moderately robust, similar in clothing and armature to legs. *Palces*.—Moderately long, not strong; superior margin has three minute teeth, and the inferior margin two, but they are very difficult to detect; *fang* rather long, well curved and exceedingly fine. *Maxilla*.—Long, narrow, arched; each rounded at base and obtusely pointed at apex; apices inclining inwards (Fig. 12). *Labium*.—Coniform, very long, arched (Fig. 12). *Sternum*.—Elongate, oval, anterior extremity rounded, posterior extremity obtusely acuminate. *Abdomen*.—Oblong. *Spinnerets*.—Long, cylindrical; apices truncated, and surrounded with well-developed spinnerules (Fig. 13).

SYMPHODES DIANIPHUS,⁶ *sp. nov.*

(Plate xiv., figs. 14, and 15).

♀ Cephalothorax, 1.6 mm. long, 12 mm. broad; abdomen, 2.5 mm. long, 1.2 mm. broad (Fig. 14).

Cephalothorax.—Oblong-ovate, arched, smooth, shining, yellow, with dusty patches on cephalic segment and at posterior angle. *Pars cephalica* arched, obtusely attenuated in front, sloping gently rearwards to junction of thoracic segment; *ocular area* broader than long; *clypeus* narrow, fringed with a few long coarse black hairs. *Pars thoracica* arched, radial grooves not deep, but distinct, a few short black bristles distributed over surface; *marginal band*, narrow. *Eyes*.—Large, distributed over two rows, each of which is slightly procurved; the front median eyes are separated from each other by a space equal to rather more than once their individual diameter; front lateral eyes are near to, but do not touch their median neighbours; lateral eyes of rear row separated from their inner neighbours by a space equal to once their individual diameter; rear median eyes twice their

διανιφος == marked with snow-white.

individual diameter apart (Fig. 11). *Legs*.—Short, robust; legs i. and ii. considerably the shortest and the most robust; of these two pairs the femora are very short and very stout; the tibia of each of these legs is short and stout, but very slightly longer than the patella; metatarsi and tarsi short and stout, and together equal in length to tibia; legs iii. and iv. are strong, though not so stout as the anterior pairs. In each leg the femur is dusky and the succeeding joints yellow. All are hairy and bespined. *Palpi*.—Moderately long, strong, similar in colour, clothing and armature to legs. *Palces*.—Moderately long, not very strong, hairy, dusky yellow. *Maxilla*.—Dusky, moderately hairy, convex, long, apices inclining inwards (Fig. 12). *Labium*.—Concolorous and similarly clothed, coniform, apex fringed (Fig. 12). *Sternum*.—Elongate, yellow, smooth, shining, broadest between coxæ ii. and iii., truncated in front, posterior extremity obtusely acuminate, surface flattened and furnished with short, stiff, scattered hairs, edges rounded. *Abdomen*.—Oblong, obovate, not overhanging base of cephalothorax, arched, clothed with long, coarse hairs, dark-brown. With two large white lateral patches at anterior extremity, two at the middle, and a small transverse white patch at posterior extremity. On the under-side, the abdomen is of a dull whitish colour in front of the *rima epigasteris*, otherwise dark-brown with a large, median oblong grey patch extending from the *rima epigasteris* to just beyond the centre; from thence dark-brown until just in front of spinnerets where there is an interrupted transverse bar of light grey. *Epigynum*.—Large, longer than broad, with two large circular pits at posterior extremity (Fig. 15). *Spinnerets*.—Long, cylindrical and whitish, clothed with long coarse hairs, apices truncated and encircled with spinnerules.

Hab.—Cape River, January 7, 1913, sweeping grass.

Family ZODARIIDÆ.

Sub-family ZODARIINÆ.

Genus *Storena*, Walck.

STORENA ? *ALBOMACULATA*, Rainb.

Storena ? *albomaculata*, Rainb., Proc. Linn. Soc. N.S. Wales, xxvii., 1902, p. 485, pl. xviii., figs. 1, 1a.

Hab.—Bowen, forest, November 1, 1912. I think there can be little doubt but that this specimen is the ♂ of my *S. albomaculata*, as in colour, ornamentation, and eye formula it agrees with that species. The species was originally recorded from Burwood and afterwards Belmore, and I have since received another example from the Tweed River, New South Wales.

STORENA AURIPES, sp. nov.

(Plate xiv., figs. 16, 17, and 18).

♂ Cephalothorax, 2.7 mm. long, 2.1 mm. broad; abdomen, 3.2 mm. long, 2.1 mm. broad.

Cephalothorax.—Dark-brown, shining. *Pars cephalica* broad, strongly arched, obtuse in front, junction of cephalic and thoracic segments distinct, a few strong, black bristles distributed over the surface; *ocular area* longer than broad, black; *clypeus* deep, narrow, fringed with long, black bristles. *Pars thoracica* arched, radial grooves indistinct, surface furnished with scattered, stiff black hairs, and ornamented with a band of fine hoary hairs running down the middle, and patches of concolorous hairs at the side; *marginal band* narrow. *Eyes.*—Eight; arranged in two procurved rows of four each; anterior row only slightly procurved, but the rear row strongly so; anterior median eyes as large as those constituting the posterior row, and separated from each other by a space equal to fully once their individual diameter; front lateral eyes smallest of the group, and each removed from its median neighbour by a space equal to half its own diameter; rear median eyes separated from each other by a space equal to once their individual diameter, and each from its lateral neighbour by a space equal to rather more than one diameter (Fig. 16). *Legs.*—Robust, long, hairy and armed with long, fine spines; anterior pairs dark-brown at base of femur, thence bright yellow; rear pairs yellow also, but darker than their anterior neighbours. *Relative lengths*, 4, 1, 2, 3. *Palpi.*—Short, hairy, armed with long, stout spines, yellow; femur longer than patella and tibia combined; *genital bulb* longer than all other joints combined; complicated (Fig. 17). *Falces.*—Concolorous with cephalothorax, arched, slightly produced, clothed with long, coarse hairs or bristles. *Mucillæ.*—Reddish-brown, shining, inner angles pale yellow, apices obtusely

truncated, inner angles fringed with long pale yellowish hairs, surface furnished with a few short, black bristles. *Labium*.—Reddish-brown also, apex yellow and rounded; arched; a few coarse black bristles spread over surface. *Sternum*.—Also reddish-brown, shield-shaped, strongly arched, fairly well clothed with hoary hairs, amongst which are scattered a few black bristles. *Abdomen*.—Ovate, arched, not overhanging base of cephalothorax, hairy. Upper surface dark-brown—nearly black, ornamented dorsally and laterally with white markings and patches; inferior surface, dull-yellow (Fig. 18).

Hab.—Pentland, September, 1914.

STORINA INORNATA, sp. nov.

(Plate xiv., figs. 19 and 20).

♀ Cephalothorax, 2.5 mm. long, 1.5 mm. broad; abdomen, 2.8 mm. long, 1.5 mm. broad.

Cephalothorax.—Obovate, reddish-brown, shining. *Pars cephalica* arched, moderately clothed with very short, fine hairs, obtuse in front, junction of cephalic and thoracic segments distinct; *ocular area* dark-brown, rather broader than long; *clypeus* moderately broad, deep. *Pars thoracica* strongly arched, radial grooves not defined; *median furca* rather long, distinct; *marginal band* narrow. *Eyes*.—Eight, equal in size, distributed over two rows of four each; both rows procurved, the rear extremely so; front median eyes separated from each other by a space equal to once their individual diameter, and each from its lateral neighbour by about one-half its diameter; rear median eyes separated from each other by a space equal to about one-and-a-half their individual diameter, and each from its lateral neighbour by a space equal to that of one diameter (Fig. 19). *Legs*.—Long, moderately strong, tapering, clothed with short, fine hairs, and armed with long, fine spines; each femur of first, second, and third pairs dark-brown from base to near junction with patella, where it is pale yellow; all other joints of legs referred to, pale yellow; the fourth pair has the femur pale yellow at base, then dark-brown, and pale yellow at apex; patella and tibia are each dark-brown with

yellow apices; metatarsus dark-brown at base and apex, with a broad, dusky yellow band in between; tarsus yellow. Relative lengths: 4, 1, 2, 3. *Palpi*.—Long, yellow, tapering, similar in colour and armature to legs. *Palces*.—Concolorous with cephalothorax, slightly projecting, strongly arched, hairy. *Maxillae*.—Strong, broad, arched, dark-brown, apices and inner angles yellow; surface furnished with a few black bristles, inner angles fringed with fine, pale hairs. *Labium*.—Long, broad, rounded at apex, which latter is fringed with long, black hairs, arched, dark-brown, apex yellow. *Sternum*.—Shield-shaped, reddish-brown, arched, surface moderately clothed with fine, hoary hairs. *Abdomen*.—Ovate, not overhanging base of cephalothorax, arched; superior surface yellow-brown, spotted with pale yellow, moderately hairy; inferior surface reddish-brown in front of *rima epigasteris*, and below that yellowish-grey. *Epigynum*.—Large, arched, bilobed, and having two deep, circular lateral pits (Fig. 20).

Hab.—(Gordonvale, August 30, 1912. A very distinct species, and remarkable from the fact that it is in no way ornamented.

(Genus *HETERICA*,⁷ gen. nov.

(Plate xiv., fig. 21, and Plate xv., fig. 22).

For the reception of the next species herein described, I propose a new genus—*Heterica*. This spider conforms closely to those we have just been studying, the *Storena*, in the form of the cephalothorax, the two rows of eyes, the presence of only one tooth on the lower ridge of the falx, and in the possession of three tarsal claws, but differs therefrom principally in the number of spinnerets. In *Storena* there are six, and of these the fore spinnerets are long, and the hind ones short; *Heterica*, on the other hand is only provided with four; the front pair are very short—almost aborted, while the hind pair are long. Indeed, the fore pair have to be carefully sought for, as they are so diminutive, and so obscured by long abdominal hairs, that they are not easily seen. The species for which I propose the specific name *urescu* is an exceedingly beautiful one. The description of the genus is as follows:—

ἑταιρικός = comrade-like.

Cephalothorax.—Obovate, arched. *Pars cephalica* obtuse in front, segmental grooves distinct; *ocular area* rather broader than long; *clypeus* not broad, deep. *Pars thoracica* broad; radial grooves and median fovea distinct. *Eyes*.—Eight, in two rows of four each; each row procurved (Fig. 21). *Legs*.—Rather long, tapering, moderately strong, armed with long and moderately strong spines; superior claws long, and each furnished with a comb of long teeth. Relative lengths: 4, 1, 2, 3. *Palpi*.—Short, strong, spined, tarsal claw furnished with a comb of long teeth. *Palces*.—Not projecting, strong, arched, lower margin of the furrow of each falx armed with one tooth. *Maxille*.—Moderately long, apices obtuse and inclining inwards (Fig. 22). *Labium*.—Longer than broad, somewhat coniform (Fig. 22). *Sternum*.—Broad, shield-shaped, truncated in front, obtusely acuminate at rear. *Abdomen*.—Ovate. *Spinnerets*.—Four. The two in front minute; rear pair long cylindrical.

HETERICA ARESCA,⁸ sp. nov.

(Plate xv., fig. 23).

♀ Cephalothorax, 2 mm. long, 1.4 mm. broad; abdomen, 2.5 mm. long, 1.4 mm. broad.

Cephalothorax.—Obovate, yellow, smooth, shining, arched. *Pars cephalica* obtuse in front, segmental grooves distinct; *ocular area* rather broader than long; *clypeus* not broad, deep. *Pars thoracica* broad, radial grooves and median fovea distinct; *marginal band* narrow, and of a rather darker tint than the surface. *Eyes*.—Eight, distributed over two strongly procurved rows of four each; front median eyes smallest of the series and separated from each other by a space equal to once their own individual diameter; front lateral eyes separated from each other by a space equal to nearly twice their individual diameter; rear median eyes near together, and each separated from its lateral neighbour by fully once its individual diameter (Fig. 21). *Legs*.—Long, moderately strong, tapering; coxæ concolorous with cephalothorax; other joints, with exception of tarsi, smoky yellow; the legs moderately

⁸ ἀρεκος = pleasing.

hairy and armed with long, fairly strong spines; superior tarsal claws long, well curved, and each furnished with twelve long teeth. Relative lengths: 4, 1, 2, 3. *Palpi*.—Short, strong, yellow, similar in clothing and armature to legs; tarsal claw long, and furnished with a number of long, fine teeth. *Falces*.—Not projecting, strong, moderately long, arched, hairy, concolorous with cephalothorax. *Maxillae*.—Concolorous with falces, moderately long, arched, apices obtusely acuminate, slightly fringed and inclined inwards, surface furnished with a few long, strong, black bristles (Fig. 22). *Labium*.—Longer than broad, concolorous, somewhat coniform, arched, surface furnished with a few short, stiff black bristles (Fig. 22). *Sternum*.—Concolorous also, shield-shaped, arched, truncated in front, acuminate at rear, surface furnished with rather long, strong bristles. *Abdomen*.—Ovate, arched, not overhanging base of cephalothorax; superior surface hairy, black, ornamented with reticulated silvery markings (Fig. 23); inferior surface dark-brown, hairy, relieved by three longitudinal, parallel whitish stripes, of which the central one is the strongest. *Epigynum*.—Small, with two circular pits.

Hab.—Pentland, sweeping foliage in forest, January 9, 1913.

Family PHOLCIDÆ.

Sub-family PHOLCINÆ.

Genus *Pholcus*, Walck.

PHOLCUS LITORALIS, L. Koch.

Pholcus litoralis, L. Koch, Verh. K.K. zool.-bot. Ges. Wien, 1867, p. 193; Die Arach. Austr., i., 1872, p. 285, pl. xxiv., figs. 1, 1a-1g.

Hab.—Gordonvale, numerous in dwellings, May, 1912.

Genus *Trichocyclus*, Simon.

TRICHO CYCLUS NIGROPUNCTATUS, Simon.

Trichocyclus nigropunctatus, Simon, Die Fauna Süd west Austr., i., 1908, p. 407.

Hab.—Hughenden, May 13, 1912.

Genus Psilochorus, Simon.

PSILOCHORUS SPHAEROIDES, L. Koch.

Pholcus sphaeroides, L. Koch, Die Arach. Austr., i., 1872, p. 283, pl. xxiii., fig. 6, 6a-6d.

Hab.—Hughenden, July 14, 1913; Townsville, July 15, 1912; Cape River, January 7, 1913; from interior of buildings.

*Family THERIDIIDÆ.**Genus Ariamnes, Thor.*

ARIANNES COLUBRINUS, Keys.

Ariamnes colubrinus, Keys, Die Arach. Austr., Suppl., 1890, p. 237, pl. xxi., figs. 5, 5a-5c.

Hab.—Aloomba, forest, sweeping grass, July 7, 1912; Gordonvale, forest, sweeping grass, August 10, 1912.

Genus Argyrodes, Sim.

ARGYRODES ANTIPODIANA, O. P. Camb.

Argyrodes antipodiana, O. P. Camb., Proc. Zool. Soc., 1880, p. 327.

Hab.—Gordonvale, August 28, 1912, August 31, 1912, May 14, 1913, March 5, 1914; Aloomba, July 7, 1912; sweeping jungle growth and grass.

ARGYRODES INCISIFRONS, Keys.

Argyrodes incisifrons, Keys., Die Arach. Austr., Suppl., 1890, p. 246, pl. xxii., figs. 5, 5a, 5b.

Hab.—Gordonvale, January, 1914, jungle, sweeping.

ARGYRODES ARGENTATA, *sp. nov.*

(Plate xv., fig. 24.)

♀ Cephalothorax, 1 mm. long, 0.5 mm. broad; abdomen, 1.2 mm. long, 1.2 mm. broad, 2.6 mm. from ventral surface to apex.

Cephalothorax.—Smooth, ovate, yellow-brown. *Pars cephalica* sloping rearward, normal grooves distinct; *ocular area* broader than long; *clypeus* moderately deep, projecting, and slightly cleft beneath median eyes. *Pars thoracica* broad in front, retreating to posterior angle where it is very narrow, radial grooves distinct; *marginal band* narrow. *Eyes*.—Eight; nearly equal in size; the four median eyes form a trapezium; the front median pair are the widest apart, and slightly the largest; lateral eyes contiguous. *Legs*.—Long, not strong, yellowish; anterior pair much the longest. Relative lengths: 1, 4, 2, 3. *Palpi*.—Short, concolorous, hairy. *Falces*.—Concolorous with cephalothorax, hairy. *Maxillae*.—Concolorous also, arched, long, and parallel. *Labium*.—Also concolorous, normal. *Sternum*.—Elongate, triangular, brown, shining, arched, moderately hairy, acuminate posteriorly, and terminating between the fourth pair of coxæ. *Abdomen*.—Gibbous, yellow-brown, with dark-brown longitudinal and transverse striations; apex obtuse, white at summit; sides ornamented with bright silvery bands and spots (Fig. 24).

Hab.—Gordonvale, sweeping forest at top of coastal range 1,500ft., May 29, 1913.

ARGYRODES ARGENTIOPUNCTATA, *sp. nov.*

(Plate xv., figs. 25, 26, and 27.)

♂ Cephalothorax, 1.1 mm. long; 0.8 mm. broad; abdomen, 1.4 mm. long, 1 mm. broad.

Cephalothorax.—Ovate, straw-yellow, smooth. *Pars cephalica* arched, ascending, sides declivous; *ocular area* broader than long; *clypeus* somewhat produced, but not cleft. *Pars thoracica* arched, normal grooves distinct; *marginal band* narrow. *Eyes*.—Of equal size, distribution normal. *Legs*.—Long, slender, tapering, apices of tibiae of first and fourth pairs orange-yellow; each leg has a few fine hairs and a few moderately long, weak spines. Relative lengths: 1=4, 2, 3. *Palpi*.—Long, straw-yellow; genital bulb large, somewhat complicated, furnished with a few short, strong spines, and clothed with long, fine hairs (Fig. 25). *Falces*.—Straw-yellow, arched, hairy. *Maxillae*.—Long, arched, straw-yellow,

parallel, apices inclining inwards. *Labium*.—Concolorous, normal. *Sternum*.—Concolorous also, elongate, triangular. *Abdomen*.—Somewhat gibbous, very slightly overhanging base of cephalothorax, yellow, upper surface and sides ornamented with irregularly formed bright silvery pits (Fig. 26).

♀ Cephalothorax, 1.4 mm. long, 1 mm. broad; abdomen, 2 mm. long, 1.5 mm. broad.

In every particular, except size and sexual characters, both sexes agree, hence a detailed description of the ♀ is unnecessary. *Epigynum*.—As in figure (Fig. 27).

Hab.—Gordonvale, sweeping jungle, on the following dates:—January, 1913, and 1914, March 5, 1914, May 25, 1913, May 29, 1913, June 3, 1912, June 4, 1913.

ARGYRODES MUSGRAVEI,⁹ *sp. nov.*

(Plate xv., fig. 28.)

♀ Cephalothorax, 1.3 mm. long, 0.8 mm. broad; abdomen, 1.7 mm. long, 1.2 mm. broad, and 1.7 mm. from apex to tips of spinnerets.

Cephalothorax.—Yellow, smooth, shining, ovate. *Pars cephalica* arched, high, retreating rearwards, sides declivous; *ocular area* broader than long; *clypeus* produced, but not cleft. *Pars thoracica* arched, normal grooves distinct; *marginal band* narrow. *Eyes*.—Equal in size; distribution normal. *Legs*.—Long, slender, tapering, dark-brown (nearly black), except coxæ and tarsi which are concolorous with cephalothorax, armed with a few short, fine spines, and clothed with exceedingly fine and short pubescence. Relative lengths: 1, 2, 4, 3. *Palpi*.—Concolorous with cephalothorax, and similar in clothing and armature to legs. *Falces*.—Concolorous also, arched, pubescent. *Maxilla and Labium*.—Also concolorous; normal. *Sternum*.—Also concolorous, elongate, triangular, arched. *Abdomen*.—Gibbous, slightly overhanging base of cephalothorax, arched, pale yellow, not shining, apex dark brown, each side ornamented with two bright, silver spots (Fig. 28), pubescent.

Hab.—Gordonvale, sweeping, September 5, 1912.

⁹ Named in honour of my Assistant, Mr. A. Musgrave.

ARGYRODES FLAVIPES, sp. nov.

(Plate xv., figs. 29 and 30.)

♂ Cephalothorax, 0.9 mm. long, 0.7 mm. broad; abdomen, 1.5 mm. long, 1.2 mm. broad.

Cephalothorax.—Ovate, dark-brown, smooth, arched. *Pars cephalica* narrow, ascending; *ocular area* broader than long; *clypeus* excavated, upper portion projecting further than the lower. *Pars thoracica* furnished with a few fine ciliate hairs; lateral grooves present, but very indistinct; *marginal band* narrow. *Eyes*.—Normal. *Legs*.—Long, tapering, straw-yellow, clothed with fine yellow hairs, and armed with short weak spines; each femur and tibia, except of leg iii., has a dark-brown annulation at apex; all metatarsi similarly annulated at apex. Relative lengths: 1, 2, 4, 3. *Palpi*.—Short, straw-yellow, with exception of genital bulb, which latter is dark-brown, short, broad, and clothed with long hairs. *Palpes*.—Short, concolorous with cephalothorax. *Maxille and Labium*.—Normal, concolorous also. *Sternum*.—Normal; also concolorous. *Abdomen*.—Elongate, triangular, arched, slightly overhanging base of cephalothorax; near the front there are two large humeral humps; apex acuminate (Fig. 29); upper surface dark-brown, streaked with yellow; sides and inferior surface concolorous.

♀ Cephalothorax 1.1 mm. long, 0.9 mm. broad; abdomen, 2.5 mm. long, 2.5 mm. broad.

Except that the ♀ is larger and darker than the ♂, and that the abdomen (Fig. 30) is broadly triangular, and as long as it is broad, both sexes are remarkably similar in appearance.

Hab.—Gordonvale, jungle, May and June.

Genus Theridion, Walck.

THERIDION PYRAMIDALE, L. Koch.

Theridium pyramidale, L. Koch, Verh. K.K. Zool.-bot. Ges. Wien, 1867, p. 190; Die Arach. Austr., i., 1872, p. 266, pl. xxii., fig. 5.

Hab.—Aloomba, July 7, 1912; Quingilli, sweeping grass in forest, September 13, 1912; Gordonvale, July 7, 1912, sweeping in forest, August 20, 1912, from nest of dead leaves, egg-sac chocolate colour, September 9, 1912, forest, egg-sac pale chocolate, October 24, 1912, sweeping grass in forest. Some specimens immature. Common in Queensland and New South Wales.

Theridion decoratum, L. Koch.

(Plate xv., figs. 31 and 32.)

Theridium decoratum, L. Koch, Verh. K.K. zool.-bot. Ges. Wien, 1867, p. 183; Die Arach. Austr., i., 1872, p. 265, pl. xxii., figs. 3, 3a.

♂ Cephalothorax, 1.2 mm. long, 1 mm. broad; abdomen, 1.3 mm. long, 1.3 mm. broad, and 1.9 mm. from apex to spinnerets.

Cephalothorax.—Ovate, arched, smooth, yellow. *Pars cephalica* ascending, attenuated in front; *ocular area* broader than long; *clypeus* narrow. *Pars thoracica* furnished with a few short, scattered hairs; radial grooves indistinct; *median fovea* distinct, recurved; *marginal band* narrow, dark. *Eyes*.—Normal. *Legs*.—Of a lighter yellow tint than cephalothorax, with dark annulations at junction of joints, long, tapering, clothed with fine hairs, and armed with moderately long spines. Relative lengths: 1, 2, 4, 3. *Palpi*.—Short, femoral and tibial joints concolorous with legs, and the genital bulb, which is large and complicated, concolorous with cephalothorax (Figs. 31, 32). *Palpes*.—Short, not strong, arched, concolorous with cephalothorax; fangs weak. *Maxillae, Labium and Sternum*.—Normal; concolorous also with cephalothorax. *Abdomen*.—Ovate, arched, pubescent, slightly overhanging base of cephalothorax, much deeper than long; colour pattern similar to ♀—see Koch's figure in "Die Arachiden des Australiens," quoted above.

Obs.—L. Koch (*supra*) describes and figures the ♀ only, but Mr. Girault succeeded in obtaining a fully developed ♂ which is herewith described. The ♀ varies considerably in colour, some forms being much darker than others.

Hab.—Gordonvale, by sweeping, taken during the months of April, August and September. Occurs in Queensland, New South Wales and Victoria.

THERIDION MUNDULUM, *L. Koch.*

Theridium mundulum, L. Koch, Die Arach. Austr., i., 1872, p. 263, pl. xxii., figs. 3, 3a.

Hab.—Gordonvale, forest, during months of June, August, September, and November. Egg-sacs, white and lilac. Occurs in Queensland, New South Wales and Victoria.

THERIDION TEPIDARIORUM, *U. Koch.*

Theridium tepidarium, U. Koch, Die Arach., viii., 1841, p. 75, pl. cclxiv., fig. 646; pl. cclxiv., figs. 644 and 645.

Hab.—Gordonvale, interior of building, September 9. World wide range.

THERIDION LIMITATUM, *L. Koch.*

Theridium limitatum, L. Koch, Die Arach. Austr., i. 1872, p. 256, tab. xxi., figs. 8, 8a, 8b.

Hab.—Gordonvale, October. Occurs also in New South Wales.

THERIDION FUSCOMACULATUM, *sp. nov.*

(Plate xv., figs. 33 and 34.)

♀ Cephalothorax, 2.1 mm. long, 1.8 mm. broad; abdomen, 3.2 mm. long, 2.8 mm. broad (Fig. 33).

Cephalothorax.—Ovate, arched, yellow-brown, hairy. *Pars cephalica* ascending, sides declivous, rather darkly clouded down the median line, segmental groove distinct: *ocular area* broader than long; *clypeus* deep, strongly bowed. *Pars cephalica* broad, radial groove and *median fovea* distinct, clouded with dark-brown; *marginal band*, dark brown. *Eyes*.—Normal. *Legs*.—Long, tapering, hairy, armed with a few short, weak spines, yellow, with yellow-brown annulations. Relative lengths: 1, 4, 2, 3. *Palpi*.—Short, hairy, yellow, tarsus annulated with yellow-brown, similar in clothing and armature to legs. *Falces*.—Moderately long, not strong, arched, tapering, inner angles clothed with a few short hairs. *Maxillae*.—Yellow, arched, apices inclining inwards, surface furnished with a few rather long, stiff hairs; inner angles almost straight. *Labrum*.—Similar in colour and clothing to the foregoing, short,

broad, arched. *Sternum*.—Yellow, suffused with dark-brown arched, shield-shaped, terminating obtusely between fourth pair of coxæ, surface furnished with a few short, dark hairs. *Abdomen*.—Ovate, strongly arched, slightly overhanging base of cephalothorax, hairy, yellow, spotted and mottled with dark-brown (almost black) markings; inferior surface yellow, with dark-brown (almost black) markings; there are also two large and broad patches of chalky-white, mottled with yellow; and these patches, of which the posterior one is much the largest and brightest, is bisected by an irregularly-shaped dark-brown band or patch. *Epigynum*.—A large dark-brown plaque, broadest in front, where it is deeply excavated; lateral angles somewhat wavy, inclining inwards; posterior extremity raised, and furnished with two large, deep pits (Fig. 34).

Hab.—(Gordonvale, forest, November. Two examples of this species, one rather darker and somewhat smaller than the other.

THERIDION ALBODECORATUM, sp. nov.

(Plate xv., figs. 35 and 36.)

♀ Cephalothorax, 2.1 mm. long, 1.8 mm. broad; abdomen, 3.2 mm. long, 2.7 mm. broad (fig. 35).

Cephalothorax.—Yellow-brown, smooth, shining, arched, ovate. *Par cephalica* ascending, obtuse in front, segmental groove distinct; *ocular area* broader than long; *clypeus* narrow, deep. *Pars thoracica* broad, radial grooves present, but not distinct; *median furca* deep; *marginal band* narrow. *Eyes*.—Normal. *Legs*.—Long, tapering, yellow with dark-brown annulations, hairy, and armed with short, fine spines. Relative lengths: 1, 4, 2, 3. *Palpi*.—Short, similar in colour and armature to legs. *Falces*.—Moderately long, tapering, arched, inner angles fringed with short, stiff, dark hairs; base and sides dark-brown, yellow in front, and at apices. *Maxillæ*.—Dark-brown, apices and inner angles pale, surface arched and furnished with a few stiff black hairs or bristles; apices truncated and inclining inwards. *Labium*.—Short, broad, arched, similar to maxillæ in colour and clothing. *Sternum*.—Shield-shaped, arched, dark-brown, terminating obtusely between fourth pair of coxæ, surface sparingly clothed with short, stiff hairs. *Abdomen*.—Ovate, strongly arched, hairy, dark-brown

generally, but somewhat lighter in the median area of superior surface; posterior extremity, sides and inferior surface ornamented with white streaks and yellowish patches. *Epigynum*.—A transverse plaque with two circular pits, which latter are separated from each other by a space equal to twice their individual diameter (Fig. 36).

Hab.—Gordonvale, forest, September 12, 1912.

THERIDION NIPHOCOSMUM,¹⁰ *sp. nov.*

(Plate xv., fig. 37.)

♀ Cephalothorax, 1 mm. long, 0.7 mm. broad; abdomen, 2 mm. long, 1.5 mm. broad.

Cephalothorax.—Ovate, arched, smooth, shining, yellow. *Pars cephalica* ascending, rounded in front, sides steep, segmental groove distinct; *ocular area* broader than long; *clypeus* narrow, deep. *Pars thoracica* strongly arched, radial grooves present, but not distinct; *thoracic fovea*, deep; *marginal band*, narrow, dark-brown. *Eyes*.—Normal. *Legs*.—Long, slender, tapering, straw-yellow with brownish annulations, clothed with fine hairs, and armed with short, weak spines. Relative lengths: 1, 4, 2, 3. *Pulpi*.—Short, straw-yellow, similar in clothing and armature to legs. *Falces*.—Concolorous with cephalothorax, arched, tapering, sparingly hairy. *Maxillæ*.—Also concolorous, arched, apices inclining inwards, sparingly hairy. *Labium*.—This is also concolorous, short, broad, arched, sparingly hairy. *Sternum*.—Shield-shaped, concolorous, smooth, shining, terminating obtusely between fourth pair of coxæ; surface furnished with a few short, stiff hairs. *Abdomen*.—Ovate. Slightly overhanging base of cephalothorax, strongly arched, faintly pubescent, yellow, ornamented with extensive patches of snowy white (Fig. 37); on the superior surface the snowy white patch is relieved by a median and somewhat conventional design and delicate tracing; laterally the patches are reticulated, and are again further relieved by dark-brown markings; inferior surface, dull yellow. *Epigynum*.—A short, oval, dark-brown, transverse plaque, with two deep circular pits situated closely together.

νιφοκοσμος = ornamented with snowy white.

Hab.—Gordonvale district, top of coastal range at 1,500ft., sweeping, forest, May 29, 1913.

THERIDIUM DIAMPHUM,¹¹ *sp. nov.*

(Plate xvi., figs. 38 and 39.)

♀ Cephalothorax, 0.8 mm. long, 0.6 mm. broad; abdomen, 1 mm. long, 0.8 mm. broad (Fig. 38).

Cephalothorax.—Ovate, arched, yellow, smooth, shining. *Pars cephalica* obtuse in front, sides declivous, segmental grooves distinct; *ocular area* broader than long; *clypeus* rounded, deep. *Pars thoracica* strongly arched, radial grooves present, but not sharply defined; *median fovea* profound; *marginal band*, narrow. *Eyes*.—Normal. *Legs*.—Long, slender, tapering, yellow, pubescent, and armed with short, fine spines. Relative lengths: 1, 4, 2, 3. *Palpi*.—Short, concolorous, similar in clothing and armature to legs. *Maxille and Labium*.—Concolorous also, and normal in form. *Sternum*.—Shield-shaped, yellow, furnished with a few fine hairs, arched, shining; posterior extremity terminating obtusely between fourth pair of coxæ. *Abdomen*.—Ovate, strongly arched, slightly overhanging base of cephalothorax, pubescent, yellow, ornamented with two large, reticulated patches and several small spots of snowy white. *Epigynum*.—A transversely oval plaque, with two large circular pits, which latter are separated from each other by a distinct ridge (Fig. 39).

Hab.—Gordonvale district, top of coastal range at 1,500ft., sweeping, forest, May 29, 1913.

THERIDIUM VENTRICOSUM, *sp. nov.*

(Plate xvi., figs. 40, 41, and 42.)

♀ Cephalothorax, 1.5 mm. long, 1.1 mm. broad; abdomen, 2.5 mm. long, 2.3 mm. broad (Fig. 40).

Cephalothorax.—Ovate, smooth, shining, dark-brown. *Pars cephalica* ascending, segmental grooves distinct, sides somewhat declivous, obtusely rounded in front; *ocular area* broader than

¹¹ *διαμφορ* = marked with snow-white.

long; *clypeus* deep. *Pars thoracica* broad, radial grooves indistinct; *median fovea* profound; *marginal band*, narrow. *Eyes*.—Normal. *Legs*.—Moderately long, rather strong, yellow with golden-brown annulations, hairy, armed with short weak spines. Relative lengths: 1, 4, 2, 3. *Palpi*.—Short, not strong, similar in colour, clothing and armature to legs. *Falces*.—Short, yellow, tapering, arched. *Maxillae*.—Normal, yellow, arched, apices inclining inwards, moderately hairy. *Labium*.—Concolorous, short, broad, arched. *Sternum*.—Shield-shaped, arched, surface yellow, margins dark-brown, sparingly hairy, posterior extremity obtuse, and terminating between fourth pair of coxæ. *Abdomen*.—Globose, slightly overhanging base of cephalothorax, pilose; superior surface yellow with dark-brown markings and reticulated snow-white patches (Fig. 41); inferior surface yellow with dark-brown markings. *Epigynum*.—A transverse, oval plaque, with two deep, circular pits (Fig. 42).

Obs.—There are two adult specimens and one immature one in the collection, and of these the former show that the species is variable (Fig. 41).

Hab.—Gordonvale, jungle, April 2, 1914.

Theridion crinitum, L. Koch.

Theridium crinitum, L. Koch, Die Arach. Austr., i., 1872, p. 271. pl. xxii., figs. 8, 8a.

Obs.—This specimen is apparently none other than the above species, although it differs from Koch's figure; firstly, the legs are longer, and secondly, the abdomen is more ovate. The epigynum, however, agrees with figure and description.

Hab.—Gordonvale, May 10, 1912. One specimen.

Theridion gibbum, sp. nov.

(Plate xvi., figs. 43, 44, and 45.)

Cephalothorax, 1.2 mm. long, 0.9 mm. broad; abdomen, 1.8 mm. long, 1.4 mm. broad (Fig. 43).

♀ *Cephalothorax*.—Ovate, straw-yellow. *Pars cephalica* raised, arched, smooth, furnished with a few rather long hairs, narrow in front, segmental grooves distinct; *ocular area* broader than long; *clypeus* moderately deep. *Pars thoracica* smooth, arched, radial grooves distinct, *median fovea* moderately deep. *marginal band* moderately broad, fringed with fine hairs. *Eyes*.—Normal. *Legs*.—Long, fine, tapering, pilose, armed with fine and rather long spines, straw-yellow generally, but having the lower extremity of each joint much darker. Relative lengths 1, 2, 4, 3. *Pulpi*.—Rather long, fine, similar in colour and armature to legs. *Falces*.—Moderately long, tapering, arched, concolorous with cephalothorax, pilose; fangs weak. *Murilla and Labium*.—Normal; concolorous with falces. *Sternum*.—Shield-shaped, arched, terminating obtusely between fourth pair of coxæ; surface furnished with a few rather long hairs. *Abdomen*.—Gibbous, slightly overhanging base of cephalothorax; upper surface creamy-white, reticulated, and ornamented with a broad, irregular, median smoky-yellow bar which is narrowest at the anterior and posterior extremities, and from which are directed oblique and irregular lateral stripes; at posterior extremity of posterior surface there is a prominent tubercular eminence suffused at base with orange-red, whilst the apex is dark-brown (Fig. 43); posterior angle similar in colour and scheme of ornamentation to superior surface; the sides have the upper portion creamy-white, reticulated, and marked with lateral stripes while the lower portion is dull-yellow (Fig. 44); inferior surface dull-yellow also and relieved by a few white spots. *Epigynum*.—A small, dark, shining, channelled, tubercular eminence with widely removed lateral, circular pits (Fig. 45).

Hab.—Gordonvale, jungle, May 9, 1913.

THERIDION THERIDIOIDES, *Keys*.

Tubusca theridioides, *Keys*, Die Arach. Austr., Suppl., 1890, p. 240, tab. xxi., figs. 6, 6a, 6b.

Hab.—Gordonvale, sweeping, forest, August 23, 1912; Pyramid Mt., sweeping grass, November 21, 1912.

THERIDION GIRAULTI, *sp. nov.*

(Plate xvi., figs. 46 and 47.)

♀ *Cephalothorax*, 1.3 mm. long, 1 mm. broad; abdomen, 2.8 mm. long, 2.4 mm. broad (Fig. 46).

Cephalothorax.—Yellow-brown, shining, ovate. *Pars cephalica* slightly raised, arched, smooth, segmental groove distinct, narrow in front; *ocular area* broader than long; *clypeus* moderately deep, fringed with fine hairs. *Pars thoracica* arched, radial grooves and median fovea distinct; *marginal band* narrow. *Eyes*.—Normal. *Legs*.—Moderately long, tapering, yellow, tibial and metatarsal joints annulated with dark-brown at apex, clothed with fine hairs and armed with short, fine spines. Relative lengths 1, 4, 2, 3. *Palpi*.—Short, yellow, similar in clothing and armature to legs. *Falces*.—Short, not strong, arched, yellow, pilose. *Mandible and Labium*.—Yellow, normal. *Sternum*.—Shield-shaped, yellow, narrowly margined with dark-brown, moderately arched, furnished with a few very short and fine hairs, and terminating in an obtuse point between fourth pair of coxæ. *Abdomen*.—Nearly globose, strongly arched, boldly projecting over base of cephalothorax; upper surface yellowish-grey, ornamented with irregularly formed, reticulated chalky-white patches; at posterior extremity there are a couple of small, black spots and a delicate scheme of tracery; sides yellowish-grey, ornamented with irregular and reticulated chalky-white patches, and dark-brown (almost black) markings; inferior surface yellowish-grey also, and relieved by dark-brown markings. *Epigynum*.—An arched, sparingly hairy, and transversely oval eminence, in the front of which are two widely removed transverse pits (Fig. 47).

Hab.—Gordonvale, sweeping jungle, April 27, 1913 (adult); same locality, sweeping jungle, June, 1914 (immature).

THRIDIUM THORELLI, L. Koch.

Theridium thorelli, L. Koch, Verh. K. K. zool.-bot. Ges. Wien, 1865, p. 857, Die Arach. Austr., i., 1872, p. 258.

Hub.—Gordonvale, forest, May 24, 1912. Originally recorded from Sydney, New South Wales.

THRIDIUM ? ALBOSTRIATUM, L. Koch.

Theridium albostriatum, L. Koch, Verh. K. K. zool.-bot. Ges. Wien, 1867, p. 187; Die Arach. Austr., i., 1872, p. 270, pl. xxii., fig. 7.

Hab.—Gordonvale forest, August 31, 1912. An immature ♀ specimen, varying somewhat from the abdominal markings as described and figured by Koch. Although not fully developed, I feel sure there can be but little doubt as to the correctness of the above determination, even though it be qualified with a note of interrogation.

THERIDION NIVOSUM, sp. nov.

(Plate xvi., figs. 48, 49 and 50.)

♀ Cephalothorax 1 mm. long, 0.7 mm. broad; abdomen, 1.9 mm. long, 1.4 mm. broad (Fig. 48).

Cephalothorax.—Ovate, pilose, yellow. *Pars cephalica* raised, arched, thoracic segment distinctly marked, and ornamented with two distinct, broad, dark sub-median bands; *ocular area* broader than long; *clypeus* narrow, moderately deep, and fringed with fine hairs. *Pars cephalica* broad, arched, normal grooves and *median fovea* distinct; *marginal band* moderately broad, creamy-yellow. *Eyes.*—Normal. *Legs.*—Moderately long, yellow, tapering, clothed with fine hairs and armed with short, fine spines. Relative lengths: 1, 4, 2, 3. *Palpi.*—Moderately long, similar in colour and armature to legs. *Fulces.*—Yellow, arched, pilose, tapering, fangs dark-brown. *Muxillæ and Labium.*—Concolorous with foregoing. Normal. *Sternum.*—Concolorous also, arched, shield-shaped, pilose, terminating obtusely between fourth pair of coxæ. *Abdomen.*—Ovate, pilose, overhanging base of cephalothorax, strongly arched; superior surface yellow, ornamented with a broad yellow, tapering, elongate median bar, which is uneven in outline; in addition to this there is a delicate concolorous tracery and snow-white patches; sides yellow, and ornamented with snow-white spots (Fig. 49); inferior surface yellow also, with two rather large snow-white spots in front of spinnerets, and a few smaller ones scattered promiscuously. *Epigynum.*—A large dark-brown, arched, transversely wrinkled, overhanging lip, the margin of which is reflexed (Fig. 50).

Hab.—Townsville, sweeping grass, July 11, 1912.

THERIDION SPINIGERUM, sp. nov.

(Plate xvi., fig. 51.)

♂ Cephalothorax, 1 mm. long, 0.7 mm. broad; abdomen, 1.4 mm. long, 0.7 mm. broad (Fig. 51).

Cephalothorax.—Pale-yellow, ovate, smooth, shining, and having a thin dark line running from near the eyes almost to posterior angle. *Pars cephalica* raised, arched, segmental groove faintly distinct; *ocular area* broader than long; *clypeus* narrow, moderately deep. *Pars thoracica* arched; *median fovea* indistinct; *marginal band* narrow. *Eyes*.—Normal. *Legs*.—Long, tapering, concolorous with cephalothorax, moderately clothed with short and very fine hairs and armed with short, fine spines. Relative lengths: 1, 4, 2, 3. *Palpi*.—Short, concolorous with legs, and similar to them in clothing and armature; *genital bulb* reddish-yellow, large, somewhat pear-shaped and complicated in structure. *Falces*.—Concolorous with cephalothorax, short, arched, weak, tapering, smooth, fangs short, weak, reddish. *Maxillæ and Labium*.—Concolorous with cephalothorax; normal. *Sternum*.—Concolorous with foregoing, arched, smooth, shield-shaped, and terminating obtusely between fourth pair of coxæ. *Abdomen*.—Ovate, arched, very slightly overhanging base of cephalothorax, pale-yellow; on the superior surface there are four black, transverse bars, the first of which is entire, and the others broken; near posterior extremity there are four long black spines (one of the inner ones missing in the type) at the sides and below the spines there are several small but distinct black markings; sides and inferior surface pale-yellow.

Hab.—Gordonvale, jungle, June, 1914.

THERIDION FUSCODECORATUM, *sp. nov.*

(Plate xvi., figs. 52 and 53.)

♀ Cephalothorax, 1 mm. long, 0.7 mm. broad; abdomen, 1.5 mm. long, 1.1 mm. broad (Fig. 52).

Cephalothorax.—Ovate, smooth, yellow, with a broad, median, longitudinal fuscous band. *Pars cephalica* raised, strongly arched, segmental groove distinct; *ocular area* broader than long; *clypeus* narrow, moderately deep, fringed with fine hairs. *Pars thoracica* broad, arched, radial grooves and *median fovea* distinct; *marginal band* narrow, pale-yellow. *Eyes*.—Normal. *Legs*.—Long, tapering, yellow, clothed with silky pubescence, and armed with short, fine spines; first and second

femoral and tibial joints each fuscous at apex. Relative lengths: 1, 4, 2, 3. *Palpi*.—Moderately long, tapering, yellow, similar in colour and armature to legs. *Fulcrs*.—Yellow, tapering, arched, pilose, weak; *fangs* short and weak. *Maxillæ and Labium*.—Yellow; normal. *Sternum*.—Shield-shaped, terminating obtusely between fourth pair of coxæ, arched, pilose, yellow, lateral margins narrowly fuscous. *Abdomen*.—Ovate, overhanging base of cephalothorax, arched, pilose; superior surface pale-yellow, clouded with fuscous, and ornamented with a broad, median, elongate, somewhat leaf-like design, which latter extends from anterior to posterior extremity; it is broader towards the middle, and varies in parts in intensity of colour; sides yellow, clouded with fuscous; inferior surface yellow, with a broad, median fuscous band, irregular in outline, and broadest at the middle. *Epiptynum*.—Two large, somewhat rounded discs placed closely together, and above each of which there is a dark, circular patch (Fig. 53).

Hab.—Gordonvale, jungle, June, 1914.

Genus Latrodectus, Walck.

LATRODECTUS HASSELTII, Thor.

Latrodectus hasseltii, Thor., Oefv. Kongl. Vetensk. Akad. Forh., 1870, p. 369; L. Koch, Die Arach. Austr., i., 1872, p. 276, pl. xxiii., figs. 2, 3, 3a.

Latrodectus scelin., L. Koch, Die Arach. Austr., i., 1872, p. 279, pl. xxiii., fig. 4.

Hab.—Gordonvale, January 23, 1913, May 24, 1912, November, 1911; Roma, October 5, 1914.

OCCASIONAL NOTES.

No. 2.

OVA-SACS OF ARACHNURA TRILOBATA. *Urq.*

By W. J. RAINBOW, Entomologist.

(Plate xvii.)

In the early part of May of this year, Mr. W. F. Howlett, of Eketahuna, New Zealand, presented to the Trustees of this Museum, a spray, measuring about 10 inches in length, containing a large series of cocoons or ova-sacs of a spider, *Arachnura trilobata*, Urq., which species occurs also in Tasmania.

In his letter, dated May 2, 1916, Mr. Howlett says:—"A friend handed me enclosed, apparently the egg-cocoons of a social spider . . . He says the spiders have all gone away now . . . I opened one cocoon and found it full of well developed spiders . . . My friend says the spiders had a very large web 'right across the track.'" In a further letter, dated June 2, 1916, Mr. Howlett says:—"It is 'social,' and of course makes geometric webs."

The species is described by Urquhart¹ as being $9\frac{1}{2}$ mm. long in the ♀, and 5 mm. in the ♂. The ♀ has a glossy black cephalothorax and glossy green abdomen, the latter terminating in three blunt, transversely wrinkled protuberances. In the ♂ the cephalothorax is dull brownish-black, while the abdomen somewhat resembles the ♀ in colour and form, but is comparatively broader at the posterior end. Mr. Howlett, in his letter dated June 2, 1916, says:—"The spider is unmistakable. From memory I call it pure black, with three humps at end of abdomen. The young have a white patch on the back." In respect of the latter, I opened one of the cocoons and took therefrom upwards of fifty individuals, some of which were

¹ Urquhart—Trans. N.Z. Inst., xvii., 1884, p. 87. pl. ix., figs. 3, 3a-3f; Proc. Roy. Soc. Tasm., 1892 (1893), p. 119.

dead. The living examples, however, are exceedingly beautiful, the cephalothorax being bright, glossy black, the abdomen dull black, but ornamented with a broad silvery median band which runs nearly the entire length.

The species disappears altogether during the winter months. Doubtless many die off, whilst others hibernate. The cocoons vary in size from 9 mm., in height and diameter at base to 6.8 mm. They are closely woven, sheeny, light copper-coloured, and glisten, when exposed to sunlight, like a new copper coin; each cocoon is soft and cushion-like to the touch, and firmly bound to the twig to which it is attached, by the silk being carried right round it. Within the outer shield there is another cocoon, soft, silky, flocculent, and concolorous. Mr. Uquhart describes the eggs as being spherical, straw coloured and agglutinated. He also states that the sexes pair in February, March and possibly earlier, and that the cocoons are generally fabricated at the ends of manuka twigs. The figure on Pl. xvii. is slightly smaller than the original, and the plant is certainly not manuka.

EXPLANATION OF PLATE XIV.

- Fig. 1. *Myiagrammopes fasciata*, Rainb., eyes
 „ 2. *Aphyetochæma maculata*, Rainb., ♀
 „ 3. „ „ „ eyes.
 „ 4. „ „ „ epigynum.
 „ 5. *Scytodes penicillatus*, Rainb., cephalothorax (profile)
 „ 6. „ „ „ ♀
 „ 7. „ „ „ epigynum
 „ 8. *Epicharitus leucosemus*, Rainb., eyes
 „ 9. „ „ „ ♀
 „ 10. „ „ „ epigynum.
 „ 11. *Symphanodes dianaphus*, Rainb., eyes.
 „ 12. „ „ „ maxillæ and labium.
 „ 13. „ „ „ spinnerets.
 „ 14. „ „ „ ♀
 „ 15. „ „ „ epigynum
 „ 16. *Storena auripes*, Rainb., eyes.
 „ 17. „ „ „ palpus ♂
 „ 18. „ „ „ abdomen.
 „ 19. „ *inornata*. „ eyes.
 „ 20. „ „ „ epigynum.
 „ 21. *Heterica aresca*, Rainb., eyes.

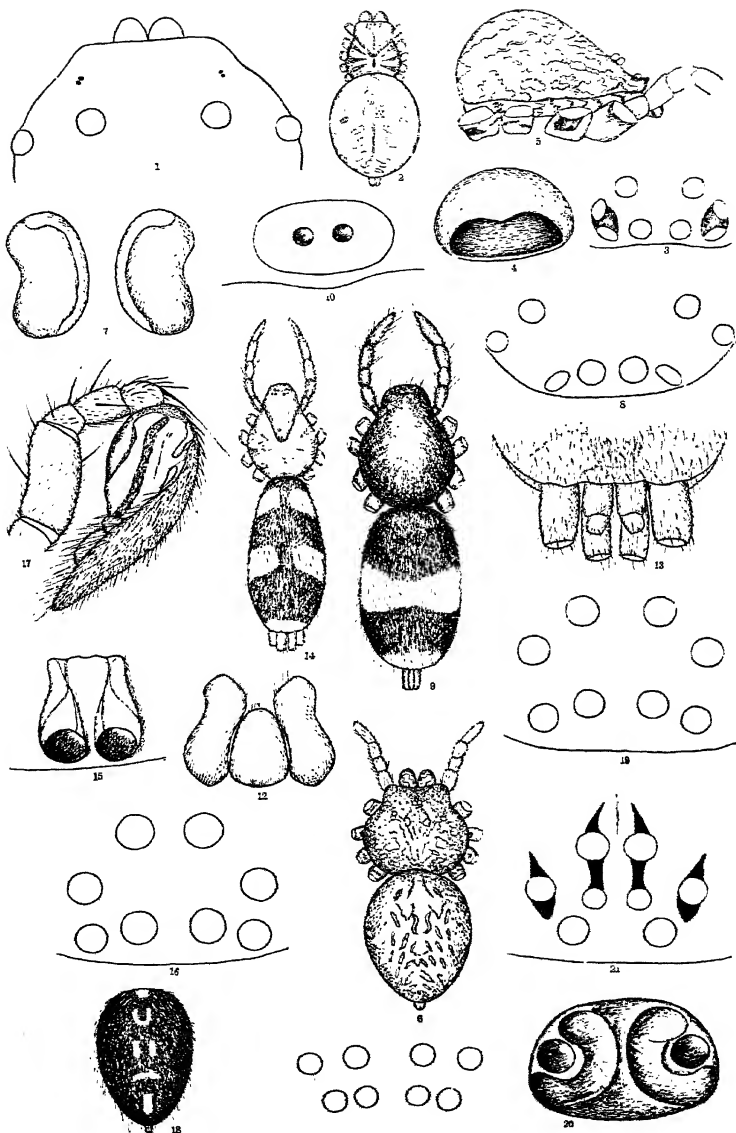
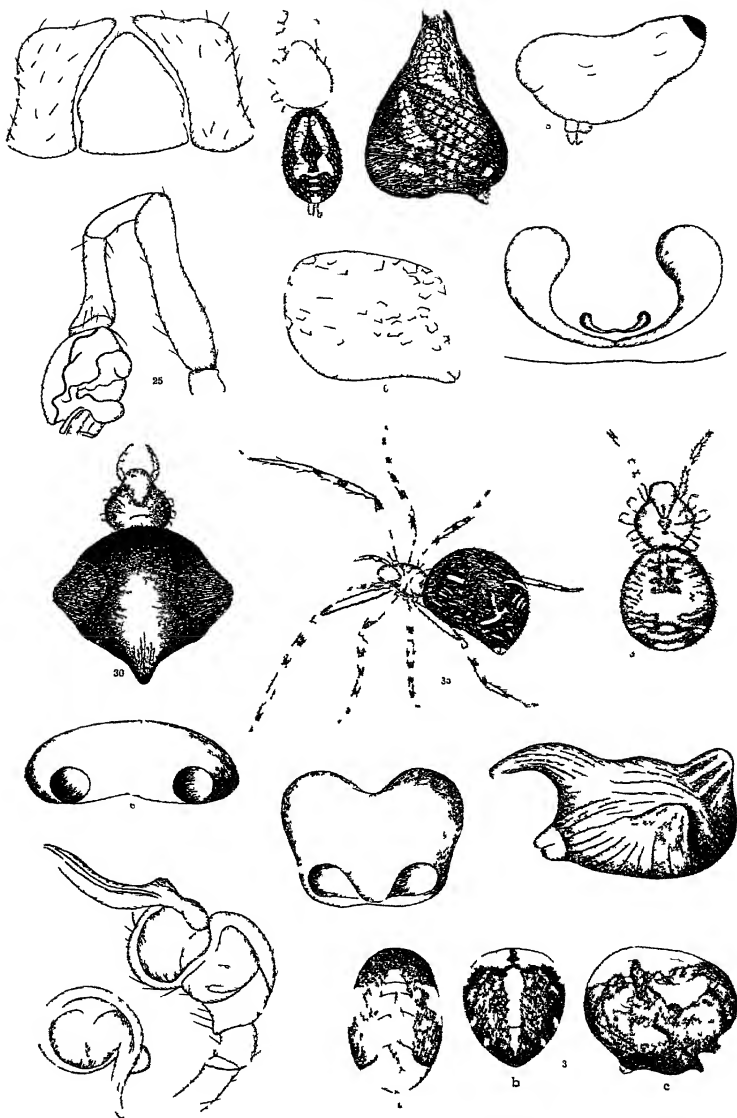


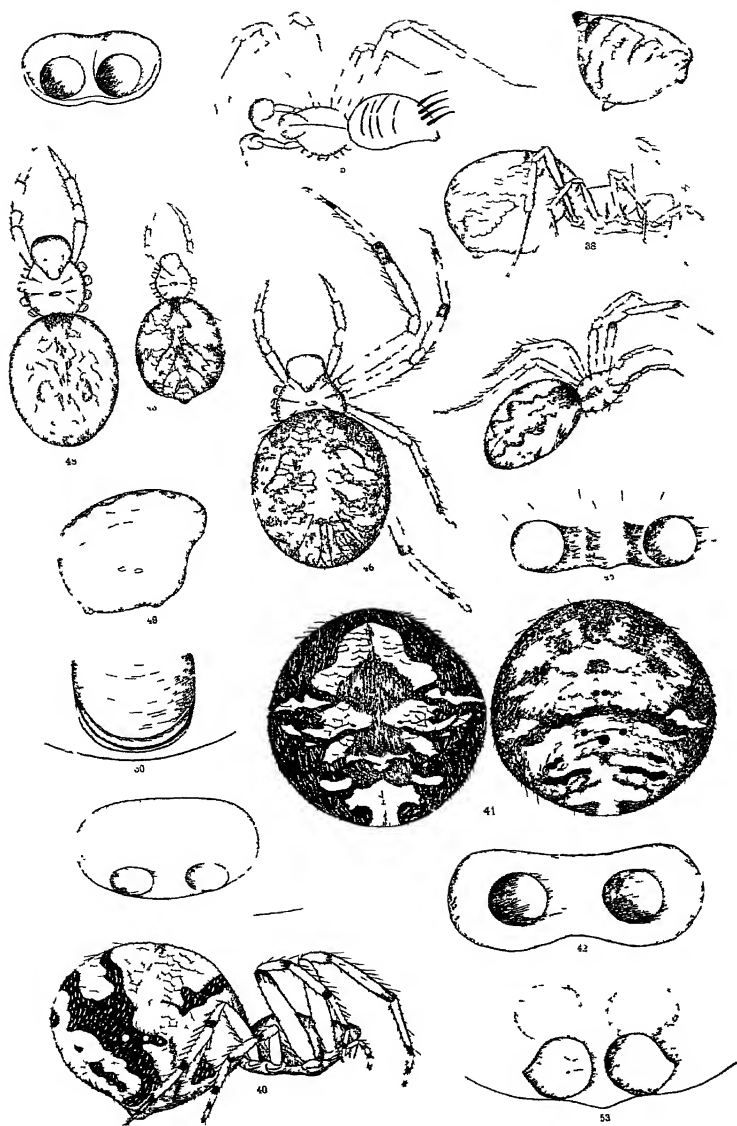
ILLUSTRATION OF PLATE XV

- Fig 22 *Heteronutesca* Ramb, maxilla and labium
 23 , , , " ♀
 , 24 *Argyodes argentata*, Ramb, abdomen
 , 25 *argentiopunctata* Ramb, palpus ♂
 , 26 " " abdomen
 , 27 " " epigynum
 , 28 *musgravi*, Ramb, abdomen
 , 29 , *flavipes*, Ramb, abdomen ♂
 , 30 , " " ♀
 , 31 *Theridion decoratum*, L Koch, palpus ♂
 , 32 " " " apex
 , 33 *fuscomaculatum*, Ramb, ♀
 , 34 " " , epigynum
 , 35 " *albodecoratum*, Ramb, ♀
 , 36 " " epigynum
 , 37 , *niphocosmum*, Ramb, abdomen (a, viewed from above b, posterior extremity c, side view)



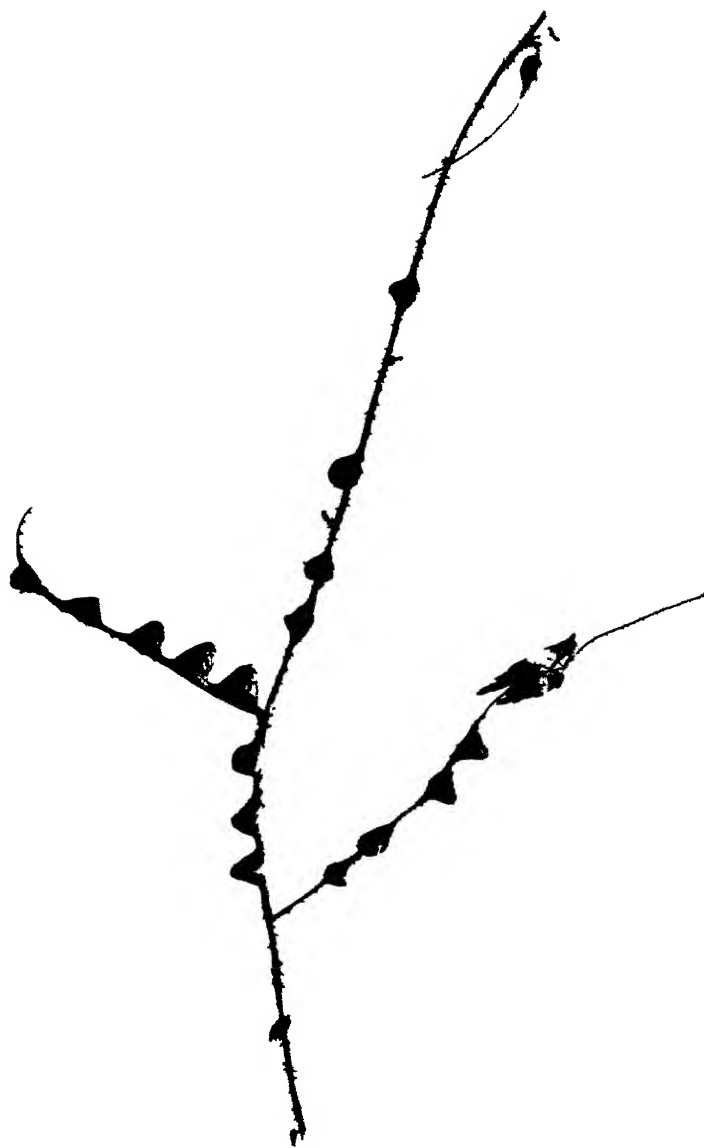
EXPLANATION OF PLATE XVI

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- Fig 38 *Theridion dianaphum*, Rainb, ♀
 „ 39 „ „ „ epigynum.
 „ 40. „ *ventricosum*, Rainb, ♀
 „ 41 „ „ „ abdomen; two
 figures showing variation
 „ 42 *Theridion ventricosum*, Rainb, epigynum
 „ 43. „ *gibbum*, Rainb, ♀
 „ 44. „ „ „ abdomen in profile.
 „ 45 „ „ „ epigynum.
 „ 46. „ *grauerti*, „ ♀
 „ 47. „ „ „ epigynum.
 „ 48. „ *nivosum*, „ ♀
 „ 49. „ „ „ abdomen in profile.
 „ 50. „ „ „ epigynum
 „ 51. „ *spinigerum*, Rainb, ♂
 „ 52. „ *fuscodecoratum*, Rainb, ♀
 „ 53. „ „ „ epigynum.



EXPLANATION OF PLATE XVII.

Carapaces of *Arachnoid trilobatus*, Uq., slightly reduced.



THE AUSTRALIAN MUSEUM:—
FRAGMENTS OF ITS EARLY HISTORY.

By R. ETHERIDGE, JUNR., Curator.

(Plates xviii.-xx.)

I.—INCEPTION AND TITLE.

It is currently believed and officially stated that the Australian Museum was inaugurated in 1836, and under that name was consolidated by the Hon. Alexander Macleay¹, Colonial Secretary (Pl. xviii.) Certain it is, however, the Museum was a "going-concern," a small one certainly, but still in existence, some years before 1836.

With whom the idea of establishing a Museum originated it is very difficult to say, for the only person known to us by name was Mr. A. M. Baxter,² Attorney General in 1828, with an anonymous writer "U." in the "Australian Quarterly Journal of Theology, Literature and Science," in the same year.

Through the courtesy of Mr. H. Wright, Librarian, Mitchell Library, my attention was drawn to the following paragraph in the "Sydney Gazette and New South Wales Advertiser" of June 28th, 1828:—

"The Attorney-General (A. M. Baxter, Esqr.) is resolving on ways and means to start a Museum in the Colony. Nothing could be more easy, if the learned gentleman would only follow up his laudable scheme with that patriotic spirit of which we all know he is so liberally possessed. In such a quarter of the globe as ours, it is a disgrace that we have not long since had a Museum formed. We trust Mr. Baxter will not be contented, until his purpose in this, as well as in every other praiseworthy enterprise, is happily effected."

¹ Macleay, Alexander—Born 24th June, 1767, Co. Ross, Scotland. In 1795 became Chief Clerk, Prisoners of War Office; in 1797 head of Department of Correspondence of the Transport Board, and its Secretary, 1806-18. In 1825 arrived in Australia as Colonial Secretary, and resigned office in 1836. From 1843 to 1846 was the first elected Speaker of the Legislative Council under the Constitution Act; died in Sydney, 19th July, 1848, in his 81st year—(Fletcher, Macleay Mem. Vol., 1893, p. vii.)—In all early official documents the family name is spelt M'Leay, not "Macleay" as in general use. It is so written in one of the earliest Museum publications—"Catalogue of the Specimens of Natural History, etc., in the Australian Museum," 8vo., 1837, being the first name on the list of those forming the Committee.

² Information is required regarding this gentleman,

From the next quotation to be made one is led to believe that Mr. Baxter's "laudable scheme" must have been under official consideration some time before. In the Mitchell Library is a document:—

"Schedule of Fixed (Contingent) Charges payable from the Colonial Revenue of New South Wales to be substituted for the Schedule of the said Charges of the 1st April, 1827."

This document formed portion of:—

"Despatch No. 89, dated at Government House, Sydney, 10th September, 1832,"

from Governor Sir Richard Bourke (who in the meantime had succeeded Governor Darling), to the Right Honorable Lord Viscount Goderich. Under *Colonial Museum*, in this Schedule appears the following:—

"Specimens of Birds and other Subjects of Natural History, originally granted 30th March, 1827"

A Museum, therefore, was evidently resolved on as early as 1827, the dates speak for themselves, and furthermore, it was referred to as the "Colonial Museum."

In the "Australian Quarterly Journal of Theology, Literature and Science," No. 1, for January, 1828, edited by the Rev. C. P. N. Wilton,³ appeared a very flowery worded article:—

"Suggestions for the Establishment of an Australian Museum"
(p. 58.)

These "suggestions" it will be noted antedate Mr. Baxter's "laudable scheme" by nearly six months. In the course of the article the author wrote as follows:—

"The foundation of a Museum for the reception and public exhibition of the natural productions and curiosities of Australia, could not but raise her in the estimation of the world at large.

³ Wilton, Charles Pleydell Neal, M.A. of St. John's College, Cambridge, Member of the Ashmolean Society of Oxford, Chaplain of Newcastle, 1831-33—Was not unknown to science. His principal contributions were:—"An Account of the Burning Mountain in Australasia, called Mount Wingen," etc.; "Geology of the Goulburn and the Hunter"; "Sketch of the Geology of six miles of the South-East Line of the Coast of Newcastle," etc.; "New Species of Encrinite," found by him on the coast. Doubt exists as to what his "Encrinite" really was. Notwithstanding the adverse views of high authority I cannot divest my mind of the opinion that this object was a Comatulid. If so, Wilton has the honour of first noticing the occurrence of this group on the coast of New South Wales, or possibly that of Australia.

while it would excite her to further efforts to maintain and increase that good opinion and respect which such a measure would produce The materials for furnishing a Museum are so abundant, particularly in Natural History that in much less time than would be necessary to erect a building for their reception a collection could be made equal in number and more interesting from novelty than anyone in existence: and that at a comparatively trifling expense . . .

A building should be erected on a plan, which would admit of, and be adopted for future enlargements and additions, as the funds of the Museum would allow, composed of a centre and wings. The centre should be of an elevation that would form a complete edifice in itself, but be so constructed as to admit of wings being hereafter added, which could be connected with the main building by a colonnade.

Care should be taken to secure sufficient ground to enable the future supporters of the Museum to increase it from time to time, by forming three other sides of the square, so that the whole when complete would form a regular quadrangular building presenting on every side a uniform elevation, A portion of the building might, with very great propriety, be applied as a public Lecture-room, in which Lectures on any subjects connected with science could be delivered. It would likewise contain room for a Public Library—an institution at present much wanted, and which will be still more so" (pp. 61-64).

Who was the author of this article? I regret to say I have been unable to ascertain and it is signed with the initial letter "U" simply. Two points at once strike one in connection with this very remarkable article:—(1) the general scheme of a quadrangular building was that ultimately adopted in the erection of the Australian Museum; (2) with the exception of "Fixed Contingent Charges" of 1827, already mentioned, for "Specimens of Birds and other Subjects of Natural History," this article would appear to be the earliest public notice of a project to establish a Museum, at any rate it is the earliest I have been able to find.

When the old documents and papers in this Museum's archives were examined and sorted a few years ago, by good luck was found a most valuable one, and of which the following is a verbatim copy, with erasures and corrections as in the original. From this paper, which carries us to 31st Dec., 1837, it is abundantly clear that a Museum of some kind was established between the years 1827-9.

Statement of the Expenditure on account of the Colonial Museum from the 16th June, 1829 to the 31st August, 1835 showing the respective Votes of Credit made by the Legislative Council for that Department.

EXPENDITURE.	AMOUNT.		VOTES OF CREDIT.	AMOUNT.	
16 June 1829 to 31 December 1830— Salaries	200	6	No Votes for these years	200*	—
1 Jan'y. to 31 December 1831— { Salaries £94 7	7	17	No Vote for this year	200*	—
{ Contingencies ... £37 10 0	0	7			
No Expenditure in 1832— Fuel & Light ... ..	...	18	Voted for the year 1832	200	0
No expenditure in 1833	—	—	Voted for the year 1833	200	0
16 Jan'y. to 31 December 1834— { Salaries ... £37 15 11	11	13	Voted for the year 1834	200	0
{ Contingencies ... £52 17 2	2	6			
Deer.	72	2			
1 Jan'y. 31 August 1835 Salaries ...	15	12	Voted for the year 1835	200	0
1 Jan'y. to 31 Decm. 1836	206	6			
1 Jan'y. to 31 Decm. 1837	140	19	1836	200	0
	227	12	1837	200	0
	£ 428	10		800	0
		4			
	949	11		1200	0
	£920	16			

† The Balance £109 6 11 Un-appropriated of this Vote has been cancelled having been deducted from the excess of the General Expenditure for that year.

Audit Office, Sydney.

2nd November, 1837

7 June 1838

* These two entries in the original are in pencil.—R.E.

There is in existence a curious old incomplete work, published in Sydney in 1835:—"Journey to the Australian Alps," by a learned scientific Pole, Dr. John Lhotsky, termed by Mr. (J. B. Barton, in his "Literature of New South Wales," 1866, "an eccentric personage." At p. 57 Lhotsky wrote:—

"It was under the administration of Governor Darling that a Museum was very judiciously founded"; then follow quotations (as under) of Voted Estimates, which are curious to say the least of it, and at the same time supplies us with an early custodian title, that of "Colonial Zoologist."

"COLONIAL ESTIMATES VOTED."

"1831 (for 1832). No detailed expenditure is to be found. But a salary which was voted in 1833 was beyond doubt also voted at an earlier period."

"1832 (for 1833). Colonial Museum, Colonial Zoologist	£130
Purchase of specimens, etc."	70
	<hr/> 200

"1833 (for 1834). Colonial Museum, Colonial Zoologist	... £130
Purchase of specimens, etc."	... .. 70
	<hr/> 200

"1834 (for 1835). Towards the support of the Colonial Museum £200. The latter item is a mere shift, in consequence of the voting of a salary to a dead man, having been commented upon at a Public Meeting, etc."

The details of expenditure given by Lhotsky were purely of a second-hand nature on his part. As:—

"Estimate of the probable expenditure of the undermentioned establishments forming a Charge on the Treasury of New South Wales"

for the years 1833-34, amongst the establishments mentioned was the "Colonial Museum." The above "Estimate" may be found in the "New South Wales Calendar and General Post Office Directory" respectively for 1833 (pp. 249, 266) and 1834 (p. 261), and it was from this source that Lhotsky no doubt derived his information.

This 1833 volume of the "Directory" contains the following reference (p. xv.) to the Museum in an article devoted to a "Sketch of the Colony":—

"A great improvement is daily taking place in the outward condition of several ranks of society. . . . For the general reader

there are a Subscription and two Circulating Libraries; for the Scientific lectures in Natural Philosophy, Chemistry, etc., and a Museum, which must ere long rise into importance for the innumerable wonders of the animal, vegetable, and mineral kingdoms of this great Southern Land."

The 1835 appropriation for the Colonial Museum given in "Abstract of the Revenue of the Colony of New South Wales, etc., for the year 1835"⁴ was only £72 0s 0d. which coincides with the expenditure given in the old document here printed *in extenso*, although the Credit Vote was set out £200 0s 0d

Just how long the title of "Colonial Museum," and just when the official change took place to that now borne by the Institution, we do not at present know for there is a slight discrepancy in the records. For instance in the "New South Wales Calendar," already referred to for 1835 (p. 371) occurs the expression:—

"Miscellaneous Services--Towards the support of the Australian ('' Museum—£200."

yet in the same publication for 1836 (p. 313), the name "Colonial Museum" is again reverted to.

The first volume of the old Minute Books of the Museum, under date of "June 7th, 1836," opens with this heading:—

"Minutes of the General Committee of the Australian Museum and Botanical Gardens"

There is also in existence a letter from the then Colonial Secretary (Alexander Macleay), dated "Colonial Secretary's Office, 5th April, 1836," relative to past financial matters of the Colonial Museum, of which more anon. It is, therefore, possible that the change of title took place between 5th April and 7th June, 1836.

But here enters the discrepancy previously referred to, for it was on 8th June, 1836, at a meeting of the Museum Sub-Committee that the first definite official proposal to change the appellation of the Institution was made, so far as I have been able to ascertain. At the meeting in question it was resolved:—

"That the Museum should be named the Australian Museum."

⁴ Votes and Proceedings of the Legislative Council during the Session 1836.

this resolution to be submitted to the "General Committee" for approval, but just when it was approved the old minutes are silent. Henceforth however, throughout all the minute books, the expression used is that of "Australian Museum." As bearing on this there is in existence a letter from the Honbl E Deas Thomson (who succeeded the Honbl Alexander Macleay as Colonial Secretary), dated "2nd May, 1842" it claims against the "Colonial Museum," but addressed to "The Committee of the Australian Museum." From the appearance of the term "Australian Museum," in the "New South Wales Calendar and Post Office Directory" for 1835 (p. 371), previously referred to, it would seem to indicate that the change of title had been in contemplation before the meeting of 8th June, 1836.

The General Committee referred to exercised control both of the Museum and Botanical Gardens, and was divided into two Sub-Committees, one for each. Although Mr J. J. Fletcher⁵ has furnished a list of the Museum body, it may not be out of place to reproduce here the names of the gentlemen, who, no doubt at considerable sacrifice of their leisure, and purely in an honorary capacity, controlled the early destinies of the two budding establishments, as follows:—

GENERAL COMMITTEE	SUB-COMMITTEES	
	Museum	Gardens
Honbl Alexander Macleay	X	X
Sir John Jameson	—	X
Capt [Adml] P. P. King, R N	X	—
William Macarthur	—	X
John Vaughn Thompson	X	X
George Porter .	—	X
Honbl. Edward Deas Thomson	X	—
R. A. Wauch .	—	X
[Sir] George Macleay	X	—
Capt. C. Sturt	X	—

⁵ Fletcher—Macleay Mem. Vol. , 1893, p ix

In the "notification" in the "N.S. Wales Government Gazette" of June 15th, 1836,^{5a} of the establishment of this governing body, it is termed:—

"A Committee of Superintendence of the Australian Museum and Botanical Gardens"

with the personnel as above.

Whatever connection the Honbl. Alexander Macleay (Pl. xviii.) had with the inception of the Australian Museum, there can be no doubt of his long and lasting interest in the establishment; the old minutes prove this.

From a remark of the venerable Dr. G. Bennett it would appear that the Honbl. Alexander was the originator.—He said:—

"The commencement of the public Museum is excellent; and Science, I believe is indebted for it to the Honourable Alexander Macleay, Colonial Secretary."⁶

Joseph Fowles, in his book "Sydney in 1848," etc. (4to 1878), referring to the Museum, speaks of Macleay as the first "President," in 1836 (p. 83).

2—EARLY CUSTODIANS.

It has always been another article of faith that the first Curator was Mr. William Sheridan Wall, but such was not the case. The first occupant of that post was Dr. George Bennett; the second, the Rev. William Branwhite Clarke, the "Father of Australian Geology" (Pl. xx.)

^{5a} Vol. vii., No 226, 1836, p. 451.

⁶ Bennett—Wanderings of a Naturalist, etc., 1834

It is, however, necessary to retrace our steps a little. In the first place who was the custodian of the "Colonial Museum" the institution to contain the "Specimens of Birds," etc., provided for in Sir Richard Bourke's despatch already referred to; and who was the "Colonial Zoologist."? Lhotsky answers these questions —

"It was under the administration of Governor Darling, that a Museum was very judiciously founded in Sydney, and the situation of Colonial Zoologist was given to Mr. W. Holmes who died at Morton Bay in August, 1830. However, the salary continued to be voted, as appears by the following account of Colonial Estimates Voted" (see details p. 71).

Evidently, therefore, the first custodian was known as the "Colonial Zoologist" in the person of Mr. W. Holmes, certainly until 1830. I have quite failed, I regret to say, to obtain confirmation of Lhotsky's statement, or any further information regarding this gentleman. What happened during the period, August, 1830 to April, 1836, is not very clear, but in a letter dated 5th April 1836, the Colonial Secretary (Alex. Macleay) wrote to the "Superintendent" on a matter of salary—now the gentleman in question was that eminent naturalist, Dr. George Bennett⁷ (Pl. xiv.)

Dr. Bennett seems to have had several titles, for Fowles, in the work already quoted (pp. 83-4) says that when the collections were housed in a small room of the Legislative Council, at the commencement of the Institution's career, Bennett was known as the "Director."

Apparently throughout 1832-35 the position of "Colonial Zoologist" was unfilled, for in the "Estimates of the probable

⁷ Bennett, George, M.D., M.R.C.S.E.—For a brief notice of this keen Naturalist see "Proceedings of the Linnean Society, Nov.. 1893-June, 1894," p. 27. It appears to be very little known that in addition to his well-known works "The Gatherings" and "The Wanderings," Dr. Bennett wrote an important "Report on the Epidemic Catarrh, or Influenza prevailing among the sheep in the Colony" (*N.S. Wales Cultivanda, etc. for 1836*, pp. 224-254; repeated in *Ibid.*, 1837, pp. 224-254).

"expenses," given in the "New South Wales Calendar" for those years, no mention of anyone by name is made, simply the title "Zoologist" is used; in the 1836 volume (p. 313), however, occurs the following:—

"Colonial Museum—Zoologist, George Bennett, Esq., Surgeon, F.L.S. and Z.S."

When the title of "Curator" first came into existence, there is at present no definite evidence to show, but by inference it was previous to 1841. I base this opinion on an important entry in the Minutes of 4th Aug., 1841, and which indicate that Dr. Bennett did enjoy that title, if only for a brief period. The entry in question is as follows:—

"A letter was read from the Colonial Secretary approving in the name of H.E. the Governor of the appointment of the Rev. William Branwhite Clarke, M.A.^b to be Secretary and Curator in the room of G. Bennett, Esq., resigned, from 1st July, 1841." (The italics are mine).

Now the position that Bennett resigned was that of Curator, for Clarke was already then Secretary, as proved by another Minute-book entry of 2nd Jany., 1839:—

"The Rev. W. B. Clarke, Secretary."

in his own handwriting, and furthermore, he was paid a salary, details of which are given on more than one occasion. But the title of "Secretary" was in use before this, there being a letter before me from the Colonial Secretary, dated 29th June, 1838, addressed to "The Secretary, Australian Museum." This dual position of Clarke's is confirmed by a statement to that effect in Tegg's "N.S. Wales Pocket Almanac and Remembrancer" (p. 153).

From these extracts I think we may conclude that the first actual Curator was Dr. Bennett, the second, the Rev. Mr.

^b Clarke, William Branwhite, M.A.—For notices of this eminent gentleman's career see Barton "Literature in New South Wales," 1866, p. 165; Heaton—"Australian Dictionary of Dates," 1879, p. 39; Etheridge—Geol. Mag., v. (2), 1878, p. 379. Heaton gave as Mr. Clarke's second name "Branthwaite," but the correct rendering is as above.

Clarke, relegating Mr. W. S. Wall⁹ to the third place in succession. I have been unable to ascertain when Mr. Clarke relinquished the position and Mr. Wall assumed the title. In the Minutes of 8th June, 1842 there is a Sub-Committee record of:—

“Mr. Wall the Preserver.”

doing some collecting.

At the meeting on September 12th, 1845, the retirement of Mr. Clarke from the position of paid Secretary was announced. The entry reads:—

“It being observed to the Meeting that by the retirement from that office of the Rev. W. B. Clarke, the Committee were without the assistance of a Secretary, Mr. Lynd¹⁰ at the general desire of the Meeting expressed his readiness to act as Honorary Secretary.”

The entry following the above is of equal interest because it definitely indicates Wall as the Curator at this date (12th Sept., 1845). It reads:—

“The Curator laid before the Meeting a large collection of prepared specimens recently made by his brother, Mr. T. Wall, in the interior of the Colony” etc.

After the 1st Nov., 1843, there is a hiatus in the Minutes, and no entries between that date and 12th Sept., 1845, when regular meetings were resumed.

⁹ Wall, William Sheridan— Was eighteen years in the Public Service of New South Wales; his connection with the Museum was severed in December, 1848, when he retired on a small pension. His “History and Description of the skeleton of a New Sperm Whale, lately set up in the Australian Museum” (8vo, 1851) proves Wall to have been an Osteologist of no mean order. Mr. — Wall, son of the former Curator, etc. informs me his father was born in Dublin in 1814, and died in Sydney, 5th Oct., 1876, aged 62. He arrived in Sydney with his brother, Mr. Thomas Wall, about the year 1840, and whilst in his native city studied anatomy at Trinity College, under Prof. Robert Harrison. The brother (T. Wall) is often referred to in old Museum documents; he was a member of the ill-fated Kennedy Expedition to Cape York Peninsula in 1848.

¹⁰ Lt. Robert Lynd, R.N.

It seems probable that the Curatorships of Clarke and Wall to some extent overlapped one another, for on 18th Nov., 1845,

“The attention of the Meeting was called to the circumstance of a balance amounting to the sum of £32 3s. 4d still remaining due to the Curator in liquidation of the full amount of his salary for the Year 1842.”

The Museum Estimates, in what may be termed this transitional year, were¹¹ —

“COLONIAL MUSEUM”

“Keeper of the rooms	10 0 0
Collector and Preserver of specimens at 1s. 9d. per diem	32 0 6
Providing Specimens, and incidental expenses ”	157 19 6
	<hr/>
	£200 0 0

Mr. Wall continued to act as Curator until 31st Dec. 1858, when he left the service, and was succeeded in the Curatorship by Mr. Simon Rood Pittard, M.R.C.S.E., appointed 17th Oct., 1859. An account of this gentleman and his work will appear subsequently.

(In an article to follow later, the migrations of the Collections will be related previous to the erection of the present building, with an account of later Curators and Secretaries.)

¹¹ New South Wales Calendar, etc. for 1836, p. 290.

EXPLANATION OF PLATE XVIII

The Honbl Alexander Macleay—Colonial Secretary, 1825-1836, Speaker, Legislative Council, 1843-1846, Committeeman, 1836-1848

(From an engraving by Charles Fox of the three quarter length portrait in the Australian Museum)



EXPLANATION OF PLATE XIX

George Bennett, M D, M R C S E—"Director"—"Superintendent"—"Zoologist", Curator, previous to 1841, Hon Secretary (1836 ?), July, 1838-1841, Committeeman (1836 ?) 1838-1853, Elective Trustee, 1853-1874



EXPLANATION OF PLATE XX

William Branwhite Clarke— 'Father of Australian Geology',
Rector of Willoughby, 1846-1870, Secretary (1836 ?),
1839-1841, Secretary and Curator, July, 1841-1842,
Committeeman, 1838-1853, Elective Trustee, 1853-1874



ARACHNIDA FROM NORTHERN QUEENSLAND.

Part II.

By W. J. RAINLOW, Entomologist.

(Plates xxi., xii., xiii.)

Family ARCHOPIDÆ.

A large number of specimens of this immense family were collected by Mr. A. A. Girault, the greater majority by far being species, the individuals of which are small. Many of them, too, were the product of the sweeping-net. A number of old friends are, naturally, included; some are common and widely distributed, some are rare and local, while others are now for the first time introduced to the student. The collection includes many exceedingly brilliant and beautiful forms.

Sub-family TETRAGNATHINÆ.

This sub-family has been divided by Simon into seven groups, but only two of these are represented here, namely, Tetragnathæ and Meteæ.

Group TETRAGNATHÆ.

The Tetragnathæ are known, popularly, as the "Stilt" spiders, in allusion to their enormously long legs, but they possess other characters that are remarkably distinctive, such as the cephalothorax which is nearly straight, but always long and narrow, and only slightly convex; by the eyes, which are slightly unequal, and distributed over two usually recurved rows consisting of four each; by the remarkable falces which are always long, and very frequently boldly projected forward in a more or less horizontal plane; and, again, by the abdomen which is always long, cylindrical and narrow. In addition to these peculiarities there are other interesting features which the student will find fully detailed in Simon's monumental work, "*Histoire Naturelle des Araignées*," 2nd ed., vol. i., 1892 (1894).

Genus Tetragnatha, Latr.

Fifteen species of this world-wide genus have, so far, been recorded from Australia, and eight of these are enumerated below, with, in addition, a new form, for which I propose the name *T. lepidula*.

TETRAGNATHA BITUBERCULATA, L. Koch.

Tetragnatha bituberculata, L. Koch, Verh. der K. K. zool.-bot Ges. Wien, 1867, p. 184; Die Arach. des Austr., 1871, p. 183, pl. xv., figs. 5, 5a, 5b; Keys., *Op. cit.*, Suppl., 1887, p. 220, pl. xx., figs. 2, 2a.

Hab.—Pentland, Sept., 1914. One ♂, and one mature and one immature ♀.

TETRAGNATHA CYLINDRICA, Walck.

Tetragnatha cylindrica, Walck., Nat. des Ins. Apt., ii., 1837, p. 210; L. Koch, Die Arach. des Austr., i., 1871, pl. xv., figs. 3, 3a, 3b, 3c.

Enagnatha cylindrica, Keys., Die Arach. des Austr., Suppl., 1887, p. 226.

Obs.—One ♂ and five ♀'s. Of the latter one was damaged and useless, and three immature. The ♂ was mature.

Hab.—Gordonvale, sweeping in low, moist situation near river, May 7, 1912, and June 15, 1912; Quingilli, sweeping forest, Sept. 13, 1912; Townsville, forest, Nov. 8, 1912.

TETRAGNATHA CYLINDRACEA, Keys.

Enagnatha cylindracea, Keys., Die Arach. des Austr., Suppl., 1887, p. 224, pl. xx., figs. 5, 5a, 5b, 5c.

Hab.—Gordonvale, forest and jungle, May and July, 1913, and June, 1914; Harvey's Creek, July, 1913; Murrawa, July, 1913; Pentland, Sept., 1914.

TETRAGNATHA DEMISSA, L. Koch.

Tetragnatha demissa, L. Koch, Die Arach. des Austr., i., 1871, p. 185, pl. xvi., figs. 1, 1a, 1b; Keys., *Op. cit.*, Suppl., 1887, p. 221, pl. xx., figs. 3, 3a, 3b.

Hab.—Murrawa, jungle, July 26, 1913. One immature ♀.

TETRAGNATHA GEMMATA, L. Koch.

Tetragnatha gemmata, L. Koch, Die Arach. des Austr., i., 1871, p. 186, pl. xvi., figs. 2, 2a-2d.

Hab.—Gordonvale, sweeping forest, top of coast range, at 1500ft., May 29, 1913.

TETRAGNATHA NITENS, *Aud. in Sav.*

Eagnatha nitens, Aud. in Sav, Descrip. de l'Egypt, xxii., 1827, p. 323, pl. ii., fig. 2.

Tetragnatha ferox, L. Koch, Die Arach. des Austr., i., 1871, p. 173, pl. xiv., figs. 4, 4a-4c, 5, 5a-5c.

Hub.—Gordonvale, jungle, sweeping growth near forest stream, May, 1914; Hughenden, July 13, 1912; Ingham, sweeping boggy, *Paulownia*-bearing meadow, July 17, 1912; Pentland, Sept., 1914; Proserpine, forest, sweeping long grass, Nov. 4, 1912.

Hub.—Gordonvale, taken from leaf of jungle tree, ("It was quite as if dead, and resembled an old Mantid case"—collector's note), April 27, 1913; sweeping forest, May, 1911; hotel verandah, Oct., 1912.

TETRAGNATHA PROTENSA, *Walck.*

Tetragnatha protensa, Walck., Hist. Nat. des Ins., Apt., ii., 1837, p. 209; Keys., Die Arach. des Austr., Suppl., 1887, p. 222, pl. xx., figs. 4, 4a, 4b, 4c.

Tetragnatha conica, L. Koch, Die Arach. des Austr., i., 1871, p. 182, pl. xv., figs. 4, 4a, 4b, 4c.

Hub.—Gordonvale, Nov. 14, 1911.

TETRAGNATHA LEPIDA, *sp. nov.*

(Pl. xxi., figs. 1, 2, 3.)

♂ Cephalothorax, 2 mm. long, 0.8 mm. broad; abdomen, 5 mm. long, 0.8 mm. broad (Pl. xxi., fig. 1).

Cephalothorax.—Oblong, yellow, smooth. *Pars cephalica* arched, obtuse in front, segmental groove distinct; *ocular area* broader than long; *clypeus* not deep, arched. *Pars thoracica* arched, radial grooves and *median furca* distinct; *marginal band* narrow. *Eyes*. Black, prominent, arranged in two recurved rows of ~~four~~ ^{two} each; the front median pair are the largest, and their lateral neighbours slightly smaller than those constituting the posterior row; the front median eyes are separated from each other by a space equal to about once

their individual diameter, and from their smaller lateral neighbours by a space equal to about twice the diameter of one of the larger eyes; anterior eyes separated from each other by a space equal to about one-and-a-half their individual diameter. *Legs*.—Long, fine, yellow, armed with short, weak spines, and clothed with short, fine, silky hair; relative lengths: 1=2, 4, 3. *Palpi*.—Long, fine, concolorous with legs, and similarly clothed and armed; *genital bulb* round, with a long tapering style, and terminating with a long, slightly hollowed, coniform process; on the third joint there are two lateral and apical spines, the shorter of which is by far the stronger (Pl. xxi., fig. 2). *Fulves*.—Concolorous with palpi, long, arched, porrected, apices wide apart, inner angles fringed with long hairs; near the apex of each falx there is, on the upper surface, two strong spines, of which the inner one is the longer; furrows of each falx armed with numerous teeth; *femur* long, not strong. *Maxillæ* and *Labium*.—Normal, yellow. *Sternum*.—Concolorous with foregoing, elongate, shield-shaped, arched, apex obtusely acuminate, and terminating between fourth pair of coxæ. *Abdomen*.—Elongate, cylindrical, slightly overhanging base of cephalothorax; superior surface silvery, finely reticulated with yellow, and ornamented with a delicate scheme of tracery, the central bar of which runs from anterior to posterior extremity; sides silvery, and finely reticulated; inferior surface yellow.

♀ Cephalothorax, 2.2 mm. long, 1.4 mm. broad; abdomen, 16.5 mm. long, 2.2 mm. broad (Pl. xxi., fig. 3).

In general appearance, colour, and scheme of ornamentation the ♀ closely resembles the ♂, but the following differences, in addition to the palpi, may be noted:—

Fulves.—Less porrected than in the ♂, and having the apices much closer together; they are also devoid of the strong apical spines. *Eyes*.—In two recurved rows of four each; the front median pair are slightly the largest of the series, and are also the closest together, being separated from each other by a space equal to once their individual diameter; from their lateral neighbours (which are the smallest of the series) they are separated by a space equal to fully three times their individual diameter; the four constituting the rear row are of equal size, and are separated from each other by a space equal to nearly twice their individual diameter.

Ob.—The species is somewhat variable in respect of its ornamentation. In some examples the tracery scheme displays a lesser number of lateral branches than shown in Pl. xxi, figs. 1 and 3 herewith; moreover, they always arise near the anterior extremity, and are much longer.

Hab.—Gordonvale, April 14, 1913, sweeping bushes and grass; May 26, 1914, sweeping in forest top of coastal range at 1,500ft; May 29, 1913, jungle: sweeping along banks of streamlet, August 23 and 30, and again on Nov. 7, 1912. Aloomba, sweeping grass in forest. July, 1912. Proserpine River, sweeping jungle bordering streamlet, Nov. 4, 1912.

Group METEÆ.

This group includes eight genera, of which only two, namely, *Meta*, C. Koch, and *Leucange*, White (= *Anguinepeira*, Emert.), occur in Australia. Both of these are widely distributed, Simon defining the range of the former as "Orbis totius reg. et calidæ," and of the latter as "Orbis totius reg. tropicæ rarius sub-tropicæ."¹

In *Meta* the species are generally of a yellow or brown tint, with the abdomen reticulated and ornamented on the superior surface with foliaceous designs, or, as in *M. ornata*, L. Koch, and *M. trivittata*, Keys., with longitudinal bars or stripes; some species, however, are numerously pitted with brilliant metallic spots. Included in the latter series is *M. argentipunctata*, Mihi, which is described hereunder.

The widely distributed and brilliant *Leucange celobesiana*, Walck., and *L. granulata*, Walck., are plentifully represented in the material collected by Mr. Girault.

Genus *Meta*, C. Koch.

META ? ORNATA, L. Koch.

(Pl. xxi., figs. 4, 5.)

Meta ornata, L. Koch, Die Arach. des Austr., i., 1871, p. 134, pl. xi., fig. 6.

¹ Simon—Hist. Nat. des Araign., vol. 1, 1892 (1894), p. 736.

The ♀ only of this species appears to have been described and figured, but Mr. Chirault collected, in addition to three females, of which one was immature, a form which I take to be the ♂, and this I describe hereunder:—

♂ Cephalothorax 1.4 mm. long, 1.1 mm. broad; abdomen, 2.2 mm. long, 1.1 mm. broad (Pl. xxi., fig. 4)

Cephalothorax.—Yellow, ovate. *Pars cephalica* obtuse in front, strongly arched, raised, segmental groove distinct; *ocular area* broader than long; *clypeus* moderately deep. *Pars thoracica* broad, arched, sloping sharply to posterior angle, radial grooves moderately distinct, *median fovea* distinct, recurved; *marginal band* broad. *Eyes*, as in ♀. *Legs*.—Long, yellow, fine, pilose, and armed with long, fine spines: relative lengths: 1, 2, 4, 3. *Palpi*.—Concolorous with legs except for genital bulb, which is dark brown; clothing and armature similar to legs; *genital bulb* large, complicated in structure, and terminating with a long flagellate style, which latter is as long as the cephalothorax (Pl. xxi., fig. 5.) *Fulcrs*.—Concolorous with cephalothorax, moderately long, parallel, arched, pilose; *fung*, reddish-brown. *Maxillæ* and *Labium*.—Concolorous with *falces*; normal. *Sternum*.—Concolorous with foregoing, broad, shield-shaped, arched, pilose. *Abdomen*.—Ovate, overhanging base of cephalothorax, arched, superior surface cream-yellow, reticulated, ornamented with three longitudinal yellow-brown bands, which latter are each of varying width, and uneven in outline; from the median band three pairs of oblique concolorous branches are directed, each of which unites with the inner edge of the lateral bands; near the front there are two moderately large yellow-brown spots, and at the centre two smaller ones; sides dull yellow, relieved by two narrow, white, reticulated bands, both of which unite in front; of these the upper one runs the entire length of the abdomen, whilst the lower one, which curves sharply downwards, terminates about midway; each band is bordered with dark-brown marks and patches; inferior surface dull yellow, with slightly curved lateral bands, which latter are white, reticulated, commence at the *rima epigasteris* and terminate shortly in front of spinnerets; in addition to these bands there is a moderately large, dark-brown patch; inner edge of each white band flanked with dark brown.

Hab.—Gordonvale, April and May, 1913. One ♂ and two mature and one immature ♀s.

META ? INSULARIS, K₁ps.

Meta insularis, K₁ps., L. Koch, Die Arach. des Austr., 1., 1871, p. 135, pl. vi., figs. 7, 8.

Obs.—An immature example of what appears to be the species quoted above.

Hab.—Gordonvale, sweeping in forest. July 2, 1912.

MILIA ARGENTOPUNCTATA, sp. nov.

(Pl. xxi., figs. 6, 7, 8.)

♂ Cephalothorax, 1.2 mm. long, 1 mm. broad; abdomen, 2.1 mm. long, 0.8 mm. broad (Pl. xxi., fig. 6).

Cephalothorax.—Ovate, straw-yellow, smooth. *Pars cephalica* obtuse in front, arched, thoracic groove distinct; a faintly perceptible, converging, narrow, darkish line runs from rear of each median posterior eye towards the base of the caput, where they unite; *ocular area* broader than long; *clypeus* not deep. *Pars thoracica* broad, strongly arched, lateral grooves faintly indicated; *thoracic fovea* distinct; *marginal band* moderately broad. *Eyes*.—Normal. *Legs*.—Concolorous with cephalothorax, long, tapering, not strong, finely pilose, and armed with weak spines; relative lengths: 1, 2, 4, 3. *Palpi*.—Short, concolorous with legs, and similar to them in clothing and armature; *genital bulb* large, complicated hairy. *Endites*.—Concolorous with foregoing, tapering, arched, apices divergent. *Maxille* and *Labium*.—Concolorous also; normal. *Sternum*.—Concolorous with foregoing, shield-shaped, arched. *Abdomen*.—Elongate, somewhat cylindrical, slightly overhanging base of cephalothorax, yellow, superior surface and sides ornamented with a number of large and small variously shaped silver spots, which latter are by far the most numerous laterally; at posterior extremity of superior surface, and also on each side of the spinnerets, there is another black spot; a few small, scattered, silvery spots are distributed over the ventral surface.

♀ Cephalothorax, 1.5 mm. long, 1.1 mm. broad; abdomen, 4.1 mm. long, 1.9 mm. broad (Pl. xxi., fig. 7).

The ♀ very closely resembles the ♂ in colour and ornamentation; the leg formula is the same, but with this difference, that leg iv. is relatively shorter than in the ♂; the *abdomen* is elliptical, and more thickly marked with silvery spots; and, finally, the *epigynum* is small, transversely elliptical, and has two bisected, almost round, shallow pits; it is pale yellow, with the rim or edge of the pits somewhat darker (Pl. xxi., fig. 5).

Hub.—Gordonvale. specimens collected between the 4th and 29th May, 1913.

Genus *Leucauge*, White.

(= *Angyropeira*, Emert.)

LEUCAUGE CELEBESIANA, Walck.

Tetragnatha celebesiana, Walck., Hist. Nat. des Ins., Apt. ii., 1837, p. 222.

Obs.—For further synonymy of this species, see the author's "Census of Australian Araneidae" in "Records of the Australian Museum," ix., No. 2, Oct. 2, 1911, p. 170.

Hub.—Gordonvale, jungle, January, 1913; top of second coast range, at 1,500ft.; forest, sweeping, May 26, 1912; jungle, June 3, 1912; forest, Aug., 1912 and Sept., 1912. Harvey's Creek, jungle, sweeping, July 13, 1913. Innisfail, jungle, sweeping, July 21, 1912.

LEUCAUGE GRANULATA, Walck.

Tetragnatha granulata, Walck., Hist. Nat. des Ins., Apt. ii., 1837, p. 222.

Meta granulata, Walck., L. Koch, Die Arach. des Austr., i., 1871, p. 136, pl. x., figs. 5, 5a.

Obs.—Included in this series were a fully developed ♂ and ♀, showing a strong tendency towards melanism

Hub.—Gordonvale, forest and jungle, sweeping, April, 1914, and May, 1913, August, Sept. 3 and Oct. 9, 1912; Murrawa, July 26, 1913; Harvey's Creek, July, 1913; Proserpine, sweeping foliage and herbage, Nov. 3, 1912.

Sub-family Nephilinae.

This is a small sub-family, consisting of four groups, two of which occur in Australia. The first of these, Phonognatheæ, embraces three genera, viz., *Phonognatha*, Sim., *Singotypa*, Sim., and *Deliochus*, Sim., so that as these genera have only, so far, been recorded from this Commonwealth, the group is purely Australian. The second group, Nephilæ, is much more widely distributed, and representatives of it are found in all tropical and sub-tropical regions. It contains the single genus *Nephila*, Leach. Examples of both these groups were collected by Mr. A. A. Girault.

Group Phonognatheæ.*Genus* Singotypa. Sim.

SINGOTYPA MELANOPYGA, L. Koch.

(Plate xvi., fig. 9).

Epeira melanopyga, L. Koch. Die Arach. des Austr., i., 1871, p. 97, pl. viii., figs. 2, 2a.

The abdominal markings in the ♀ of this species vary in intensity in different individuals, while the dark patch at the posterior extremity is wanting in some examples. The ♀ only was described and figured by L. Koch, but Mr. Girault was successful in securing several examples of the ♂, in respect of which I append the following notes:—

♂ Cephalothorax 4 mm. long, 2.5 mm. wide; abdomen, 5 mm. long, 2.8 mm. wide.

In general appearance, such as colour and general scheme of ornamentation, both sexes agree, but as remarked above in respect of the ♀, similar variation is noticeable in different individuals. Allowing for these the student will be guided by L. Koch's description and figures. The *pulpi* of the ♂ may be described as follows:—

Moderately long, clothed with a few short hairs and long bristles; pale yellow with exception of genital bulb, which is much darker; *genital bulb* large, complicated (Pl. xxi., fig. 9).

Obs.—A common species. A large number were collected, but they were mostly in a bad condition.

Hab.—Pyramid Mt., Gordonvale, at 400ft, September 9, 1912.

Deliochus, *Sim.*

DELIOCHUS PULCHRA, *sp. nov.*

(Pl. xxi., figs. 10, 11.)

♀ *Cephalothorax*, 2.1 mm. long, 1.5 mm. broad; abdomen, 3.5 mm. long, 2.3 mm. broad (Pl. xxi., fig. 10).

Cephalothorax.—Ovate, yellow. *Pars cephalica* obtuse, arched, smooth, clouded with dusky yellow at summit, sides and rear extremity; segmental groove distinct; *ocular area* broader than long; *clypeus* arched, moderately deep. *Pars thoracica* rather broad, strongly arched, radial grooves distinct, lateral angles clouded with dusky yellow; *median fovea* profound, clouded in front, behind, and at its depth with smoky yellow; *marginal band* rather broad, yellow. *Eyes*.—Arranged in three series of 2, 4, 2; the four comprising the median group are the largest, are close together, and distributed so as to form a trapezium; lateral eyes are small, and arranged in pairs; they touch each other, and are seated obliquely; each eye is of a pearl-grey lustre, and encircled by a black ring. *Legs*.—Long, tapering, first pair much the longest, straw-yellow with smoky-yellow annulations, hairy, and armed with fine, long spines; relative lengths: 1, 2, 4, 3. *Palpi*.—Moderately long, similar in colour and armature to legs. *Falces*.—Strongly arched, smooth, yellow, apices slightly divergent, inner angles hairy. *Maxillæ*.—Moderately long, broad, divergent, arched, apices and inner angles pale yellow, bases and outer angles smoky-yellow. *Labium*.—Short, broader than long, arched, smoky-yellow, apex straw-yellow. *Sternum*.—Shield-shaped, hairy, arched, smoky-yellow, surface uneven, apex acuminate and terminating between fourth pair of coxæ. *Abdomen*.—Ovate, overhanging base of cephalothorax, arched, posterior extremity somewhat obtuse; superior surface yellowish-grey, ornamented by numerous small, silvery-white spots, a delicate, median scheme of tracery, and from about midway to posterior extremity a series of dark-brown (nearly

black). oblique patches; sides yellowish-grey, also relieved by numerous small, silvery-white spots and irregular dark-brown patches; inferior surface yellow-grey, also ornamented with small, silvery-white spots; a dark-brown median patch extends from the *rima epigasteris* to spinnerets; this patch is uneven in outline, free from silvery-white spots, but has a smoky-yellow patch in front and a much darker patch posteriorly; the median patch herein described curves inwards from anterior extremity, then boldly outwards towards spinnerets, from whence it curves sharply in again, and is therefore much the narrowest at this point; at the apex of the point referred to there is a slightly curved line, the lateral extremities of which are directed downwards. *Epigynum*.—A transverse plaque, with two large, rather deep pits (Pl. xxi, fig. 11).

Hab.—Gordonvale, sweeping jungle, June 30. 1912; an immature example from Pentland, September, 1914.

DELIOCHUS PULCHRA, *var. MELANIA*, *var. nov.*

(Pl. xxi., fig. 12.)

♀. This example is somewhat smaller than the foregoing, and very much darker. The cephalothorax is not of such a pale yellow as that of the typical form, while the markings on *pars cephalica* and *pars thoracica* are nearly black. The eyes, palpi, legs, as also the falces, maxillæ and labium agree with the type. The abdomen is yellowish-grey, ornamented with silvery-white spots and dark-brown (bistre) down the centre of the superior surface and laterally (Pl. xxi., fig. 12). *Epigynum*.—As in type.

Hab.—Gordonvale, June 15, 1912.

(Group *NEPHILEÆ*.)

(Genus *Nephila*. *Leach*.)

Only four specimens of this genus were taken, and they are as follows:—

NEPHILA MACULATA, *Fab.*

Aranea maculata, *Fab.*, *Entom. Syst.*, ii., 1793, p. 425.

Hab.—Pyramid Mt., Gordonvale, Feb. 15, 1912.

NEPHILA MACCLATA, var. *PENICILLUM*, Dol.

Epeira penicillum, Dol., Bijdr., 1857, p. 412; Tweed Bijdr., 1859, pl. ii., fig. 4.

NEPHILA FLAGELLANS, L. Koch.

Nephila flagellans, L. Koch, Die Arach. des Austr., i., 1871, p. 153, pl. xii., figs. 5, 5a, 6, 6a.

Hab.—Gordonvale.

Sub-family ARGIOPINÆ.

This large sub-family has been divided by Simon into twenty-eight groups, the majority of which are represented in Australia. The first of these is the Argiopeæ, and this contains two genera, each of which are represented in the Girault collection, and are enumerated below. The first genus, *Argiope*, Aud. in Sav., contained up to the time of the publication of this paper, fifteen species, and to these I now add one more—*A. probata*, sp. nov. The genus *Glea*, C. Koch, is a very small one, and is only represented in Australia by two species. The present collection contains one specimen of each, and one of these is an immature example. The latter differs somewhat from L. Koch's description and figure of *G. theridioides*, but it is not sufficiently developed to enable one to dogmatise, and say it is not that species, and so I include it here with a query.

Group ARGIOPEÆ.

Genus *Argiope*, Aud. in Sav.

ARGIOPE ETHEREA, Walck.

Epeira ætherea, Walck., Hist. Nat. des Ins., Apt., ii., 1837, p. 112.

Argiope regulis, L. Koch, Die Arach. des Austr., i., 1871, p. 36, pl. iii., figs. 4, 4a; op. cit., p. 43.

Hab.—Cooktown, February 6, 1912; Gordonvale, April 10, 1913, August 10, 1912, August 27, 1913 and August 30, 1912 (forest); Proserpine River, November 14, 1912. Several immature examples.

ARGIOPE PICTA, *L. Koch.*

Argiope picta, L. Koch, Die Arach. des Austr., i., 1871, p. 33, pl. iii., figs. 3, 3a.

Argiope gorgona, L. Koch, *loc. cit.*, p. 35.

Hab.—Gordonvale, forest, August 27, September and December 24, 1912.

ARGIOPE SYRMATICA, *L. Koch.*

Argiope syrmatica, L. Koch, Die Arach. des Austr., i., 1871, p. 213, pl. xviii., figs. 9, 9a, 9b.

Hab.—Gordonvale, August 31, 1912 (immature).

ARGIOPE TRIFASCIATA, *Dol.*

Epeira (Argiopes) trifasciata, Dol., Bijdr., 1857, p. 416; Tweede Bijdr., 1859, pl. i., fig. 3.

Hab.—Gordonvale, open forest, May 24, 1912, August 30, 1912. Two examples—one mature and one immature.

ARGIOPE LUGUBRIS, *L. Koch.*

Argiope lugubris, L. Koch, Die Arach. des Austr., i., 1871, p. 209, pl. xviii., figs. 6, 6a, 6b, 7, 7a, 7b.

Hab.—Aloomba, forest, sweeping grass, July 7, 1912. One ♂ example

ARGIOPE PROTENSA, *L. Koch.*

Argiope protensa, L. Koch, Die Arach. des Austr., i., 1871, p. 211, pl. xviii., figs. 8, 8a, 8b.

Hab.—Hughenden, July 14, 1912; Magnetic Is., forest, July 27, 1913.

ARGIOPE PROBATA, *sp. nov.*

(Pl. xxi., fig. 13).

♂ Cephalothorax, 1.1 mm. long, 1 mm. broad; abdomen 3.7 mm. long, 1.2 mm. broad (immature).

Cephalothorax.—Smooth, shining, yellow. *Pars cephalica* short, very slightly arched, thoracic groove distinct; ocular area broader than long; *clypeus* not deep. *Pars thoracica* broad, very slightly arched, sides rounded, radial grooves faintly defined; *thoracic fovea* distinct; *marginal band* narrow. *Eyes*.—Normal. *Legs*.—Long, moderately strong, tapering, armed with long, dark-brown spines, and clothed with fine pubescence; relative lengths: 1, 2, 4, 3. *Palpi*.—Short, similar in colour and clothing to legs. *Falces*.—Concolorous with palpi, short, arched. *Maxilla* and *Labium*.—Normal; concolorous with falces. *Sternum*.—Cordiform, very slightly arched, truncated in front, and terminating in an obtuse point between posterior coxæ; yellow, with a cream-white marginal transverse band in front, and having (starting near the middle, and terminating posteriorly) a longitudinal and uneven band of creamy-white; this band is broadest just in front of the posterior coxæ, narrowing from thence sharply inwards, and then bulging outwards at posterior extremity. *Abdomen*.—Elongate, slightly overhanging base of cephalothorax, arched, rather narrow in front, from whence it curves outwards until just beyond the middle, thence retreating to posterior extremity where it terminates obtusely; superior surface creamy-white, reticulated with dull yellow, and displaying a distinct scheme of tracery; sides yellowish-grey, reticulated with dull yellow; inferior surface reticulated with dull yellow also, creamy-white in front and at sides of spinnerets, but yellowish-grey below them. *Spinnerets*.—Compact and normal, but seated about midway.

♀ Cephalothorax, 2.5 mm. long, 2.3 mm. broad; abdomen, 7.3 mm. long, 2.5 mm. broad (Pl. xxi., fig. 13).

Cephalothorax.—Broadly ovate. *Pars cephalica* arched, truncated in front; yellow, suffused with yellow-brown, segmental groove distinct; *ocular area* broader than long; *clypeus* narrow, not deep. *Pars thoracica* broad, very slightly arched, sides rounded, radial grooves and *thoracic fovea* distinct; yellowish down the centre and at outer angles, dark brown in between; *marginal band* narrow. *Eyes*.—Normal. *Legs*.—Long, moderately strong, tapering, armed with long black spines and pubescent; relative lengths: 1, 2, 4, 3. *Palpi*.—Short, yellow, similar in clothing and armature to

legs. *Fulves*.—Yellow, and cylindrical, arched. *Murillæ* and *Labium*.—Normal, yellow-brown at base, apices pale yellow. *Sternum*.—Broad, shield-shaped, slightly arched, terminating obtusely between posterior coxæ, surface uneven, a small tubercle in front of each coxa of the first, second, and third pairs of legs, yellow-brown laterally, creamy-white at the middle and at the apex. *Abdomen*.—Elongate, somewhat truncated in front, obtuse at posterior extremity, overhanging base of cephalothorax, arched; superior surface creamy-white, ornamented with a long, dull yellow, leaf-like design down the centre; the latter spotted with creamy-white, and displaying a distinct scheme of tracery; sides and inferior surface dull yellow, spotted with creamy-white. *Epigynum*.—A small, arched tubercle, having two deep, lateral, bisected pits. *Spinnerets*.—Normal, seated about midway.

(Obs.—Allied to *A. protensa*, L. Koch, and *A. symmatia*, L. Koch, but differing from each of these by its much smaller size, more broadly rounded cephalothorax, structure of epigynum, and abdominal ornamentation; the general form of the abdomen, however, is very similar to that of each of those quoted above. In respect of *Aryiope probata* it only remains to be said that the general colour scheme of the abdomen is the same in each sex, but in the immature ♂ form before me there is no trace of the leaf-like design referred to in the description of the ♀.

Hab.—Pentland, September, 1914.

Genus Gea, C. Koch.

GEA PRÆCINCTA, L. Koch.

Ebena præcincta, L. Koch, Die Arach. des Austr., i., 1871, p. 130, pl. x., figs. 2, 2a, 3, 3a.

Obs.—Very variable; previously recorded from Palm Island, Great Barrier Reef, and Samoa.

Hab.—Gordonvale, forest and jungle; also forest, top of Coastal Range, at 1,500ft., May and June; Aloomba, sweeping grasses, forest, July; Harvey's Creek, sweeping jungle, July; Murrawa, jungle, July; Pentland, September.

GENA ? THERIDIIFORMIS, L. Koch.

Eben theridioides, L. Koch, Die Arach. des Austr., i., 1871,
p. 132, pl. x., figs. 4, 4a-4e.

Hab.—Gordonvale, forest, August 4, 1914. One immature specimen.

Genus *Cyrtophora*, Sim.

CYRTOPHORA PARVASIA, L. Koch.

Cyrtophora parvasia, L. Koch, Die Arach. des Austr., i., 1871,
p. 126, pl. ix., figs. 8, 8a

Hab.—Gordonvale, forest, Aug. 31 and September 9, 1912.

CYRTOPHORA HIRTA, L. Koch.

Cyrtophora hirta, L. Koch, Die Arach. des Austr., i., 1871,
p. 125, pl. ix., figs. 7, 7a.

Obs.—The female fabricates the usual type of web peculiar to the species; it consists of numerous irregular lines, and a primitive orbicular snare; connected with the web, according to Girault's observation, there is a large conical case-like nest, which is suspended in grass; the ova-sac, of which one example was collected, is of a crude, pear-shaped form, closely woven, green, 18 mm. long and 36 mm. in circumference.

Hab.—Gordonvale, forest, May 4, 1913; also September 9, 1912.

Group CYCLOSEÆ.

Genus *Cyclosa*, Menge.

CYCLOSA VALLATA, Keys.

Cyclosa vallata, Keys., Die Arach. des Austr., Suppl., 1886,
p. 149, pl. xii., figs. 5, 5a, 5b.

Obs.—In his field note in respect of one of these specimens, Mr. A. A. Girault says:—"Forest, from folded leaves, 3 Sept., 1912." Four Australian species have been recorded, but in respect of only one of these *C. (Epeira) pullida*, mihi, have any field notes been published.² Simon has given some interesting notes on various species of *Cyclosa* from other parts of the world, and to his work the reader is directed.³ The group Cycloseæ is very small, only four genera having been recorded to it, and of these *Cyclosa* is the sole Australian representative.

.Hab.—Gordonvale, May and September, 1912; Murrawa, jungle, July 26, 1913.

Group MANGOREÆ.

Six genera are included in this group, only one of which has so far been recorded from Australia, viz., *Larinia*, Simon, the range of which according to that distinguished author is "Orbis totius reg. calidæ subtrop., rarius tropicæ."⁴ The genus is represented in our fauna by three species, two of which are recorded below. Of these, *L. tubida*, L. Koch, is known only from Northern Queensland, whilst the other, *L. phthisica*, L. Koch, ranges from Northern Queensland to Victoria. The third species, *L. eburneiventris*, Simon, is a West Australian form.

Genus *Larinia*, Sim.

LARINIA PHTHISICA, L. Koch.

Epeira phthisica, L. Koch, Die Arach. des Austr., i., 1871, p. 103, pl. viii., figs. 5, 5a; Keys., *Op. cit.*, Suppl., 1887, p. 171, pl. xiv., figs. 6, 6a.

Obs.—The species displays considerable variation, but it may always be distinguished by the structure of the epigynum. Although a large number of specimens were taken, many of them were immature.

² Rainbow.—Proc. Linn. Soc. N.S. Wales, xxiii., 1897, pp. 535-6.

³ Simon.—Hist. Nat. des Araign., i., 1892 (1895), pp. 781-2.

⁴ Simon.—*Loc. cit.*, p. 795.

Hab.—Gordonvale, sweeping, forest and jungle patch, April 27, 1913, forest, June 6, 1914, August 12, 1912; sweeping along banks of streamlet, September 5, 1912, forest; September 8, 1910, sweeping grass, October 9, 1912. Townsville, sweeping grass, July 11, 1912. Aloomba, sweeping grass, July 7, 1912. Pentland, September, 1914. Proserpine River, November 3, 1914.

LARINIA TABIDA, *L. Koch.*

Epeira tabida, *L. Koch*, *Die Arach. des Austr.*, i., 1871, p. 105, pl. viii., figs. 6, 6a; *Keys.*, *Loc. cit.*, *Suppl.*, 1887, p. 170, pl. xiv., figs. 5, 5a.

Hab.—Gordonvale, forest, sweeping low bushes and grasses, April 14, 1913; forest, sweeping along streamlet, June 27, 1913; taken from web, August 31, 1912. Proserpine River, sweeping foliage and grass, November 3, 1912; taken from cells of *Sceliphron letum*, *Smith*, December 27, 1913. Quingilli, sweeping grass in forest, September 13, 1912.

(Group ARANEÆ.

This is the seventh group into which *Simon* has divided the sub-family Argiopinae, and although it is composed of only five genera it is remarkable for the large number of species it contains. The greatest genus is, of course, the ubiquitous *Araneus*, *Clerck*, the distribution of which is "Orbis totius regiones omnes." The two other genera occurring in Australia are:—*Arepalpis*, *L. Koch* (the range of which is "N.-Guinea; N.-Hollandia; Amer. centr. et merid") and *Arroaspis*, *Karsch*, which occurs only, as far as we know at present in "Nova-Hollandia."⁵

Genus Araneus, Clerck.

In order to facilitate the study of this enormous genus, *Simon* divided it into six series, which he based chiefly on their eye formulæ. In this paper I propose, with the material I have in hand, to adopt the simpler method used by *Professor J. H. Comstock* in his magnificent work, "The Spider Book." This learned author divided the genus into five sections, viz.:—

⁵ *Simon*.—*Loc. cit.*, p. 830.

"*The Large Angulate Araneus*."

"*The Smaller Angulate Araneus*."

"*The Large Round-shouldered Araneus*."

"*The Three House Araneus*."

"*The Smaller Round-shouldered Araneus*."⁶

The fourth section I omit for reasons stated in another part of this paper. Up to the present ninety-eight species of this genus were known as occurring in Australia, and this paper brings up the total to 105

The Larger Angulate Araneus.

This section contains all those of the larger species bearing a pair of more or less prominent humps or tubercle-like projections towards the anterior extremity of the abdomen. Only two species falling into this section were collected by Mr. Girault, one of which is the well-known *Araneus productus*, L. Koch, and the other, a form now described as new—*A. acachmenus*. By far the greater number of species collected by my friend were forms of moderate or small size.

ARANEUS PRODUCTUS, L. Koch.

Epeira producta, L. Koch, Verh. der K. K. Zool.-bot. Ges. Wien, 1867, p. 178; Die Arach. des Austr., i., 1871, p. 55, pl. iv., figs. 5, 5a, 6, 7, 7a.

Obs.—Common and widely distributed; varies considerably in size, colour and markings, but can always be distinguished by the enormously long scape of the epigynum.

Hub.—Gordonvale, 1911; three specimens, two ♀'s and and one ♂.

⁶ Comstock.—The Spider Book, 1912, p. 468.

ARANEUS ACACHMENTUS,⁷ sp. nov.

(Plate xxi., figs. 14, 15).

♀ Cephalothorax, 4.6 mm. long, 3.6 mm. broad; abdomen, 6.7 mm. long, 5.4 mm. broad (Pl. xxi., fig. 14).

Cephalothorax.—Obovate, reddish-brown, hairy. *Pars cephalica* arched, truncated in front, clothed with long and short yellowish hairs, sides declivous, thoracic groove distinct; *ocular area* broader than long, the tubercle carrying the median eyes projecting forward; *clypeus* pale, deep. *Pars thoracica* strongly arched, smooth, furnished with a few short, scattered hairs, radial grooves not strongly defined; *marginal band* broad, pale yellow. *Eyes*.—In three groups of 2, 4, 2; lateral eyes small, arranged in pairs, widely removed from median group, contiguous; median group large, poised upon a tubercle, and forming a trapezium. *Legs*.—Rather long, strong, yellow, with dark brown annulations, hairy and armed with numerous short strong spines; relative lengths: 1, 2, 4, 3. *Palpi*.—Short, strong, yellow, not annulated, similar in clothing and armature to legs. *Falces*.—Rather long, very strong, slightly projected in front of clypeus, strongly arched, hairy, front and inner angles pale yellow, apices and outer angles concolorous with cephalothorax; inner angle of the furrow of each falx armed with three strong teeth, and the outer angle with five; of the latter the second but one from the base is much the longest and strongest, and the one near the fang the shortest; *fang* strong, well curved. *Maxillae*.—Normal, moderately hairy, yellowish, inner angles almost white. *Labium*.—Normal, base smoky yellow, apex nearly white. *Sternum*.—Shield-shaped, moderately arched, yellowish-brown, thickly clothed with long, pale, yellowish hairs. *Abdomen*.—(Ovate, posterior extremity acuminate, hairy, hairs very long in front, overhanging base of cephalothorax, furnished with two large and prominent lateral tubercles; superior surface mottled dark velvety brown and pale yellow, and ornamented with a large foliated design which commences in front and includes the tubercles in its scheme; rear angles of tubercles pale yellow; sides yellow, irregularly streaked with dark brown; in

⁷ ἀκαχμενος = sharp pointed; in reference to the pointed abdominal tubercles.

addition to the latter there are also large irregularly shaped dark brown patches; inferior surface yellow with smoky-brown, irregularly shaped transverse patches and scattered spots. *Epigynum*.—A short, dull whitish, bluntly acuminate process (Pl. xxi., fig. 15).

Hab.—Gordonvale, November, 1913.

The Smaller Angulate Araneus.

A large number of medium sized and small species are contained in this and the round-shouldered series. Some of the forms are common and widely distributed.

ARANEUS TRIGONUS, L. Koch.

Epeira trigona, L. Koch, Die Arach. des Austr., i., 1871, p. 50, pl. iv., figs. 1, 1a, 1b; Thor., Studi Ragin Mal e Papuani, iii., 1881, pp. 15 and 19.

Hab.—Cooktown, taken from cell of *Scelephron*, sp., February 6, 1912.

ARANEUS LUTULENTUS, L. Koch.

Epeira lutulenta, Keys., Die Arach. des Austr., Suppl., 1886, p. 143, pl. xi., figs. 6, 6a.

Hab.—Gordonvale, May 1, 1912.

ARANEUS COLLINUS, Keys.

Epeira collinus, Keys., Die Arach. des Austr., Suppl., 1886, p. 141, pl. xi., figs. 5, 5a.

ARANEUS EXTUBERATUS, L. Koch.

Epeira extuberala, L. Koch, Die Arach. des Austr., i., 1871, p. 61, pl. v., fig. 3; Hogg, Rep. Horn Expl. Exped., ii., Zoology, 1896, p. 311.

Obs.—Humeral tubercles of this species are exceedingly small.

Hab.—Gordonvale, from cell of *Scelephron*, October 20, 1912. Originally recorded from New Zealand.

The Smaller Round-Shouldered Araneus.

No large forms in this section were collected; indeed the largest and most frequent was the common and widely distributed *Araneus theis*, Walck. Some exceedingly brilliant and metallic specimens are included in this section amongst the material collected by Girault.

ARANEUS THEIS, Walck.

Epeira theis, Walck., Hist. Nat. des Ins., Apt. ii., 1837, p. 53, pl. xviii., fig. 4.

Epeira mangareva, Walck., *Op. cit.*, Apt. iv., 1847, p. 469; L. Koch, Die Arach. des Austr., i., 1871, p. 85. pl. vii., figs. 4, 4a, 5, 5a.

Obs.—Many specimens immature.

Hab.—Gordonvale, jungle, January, 1913; forest, April and May, 1912; sweeping forest, June, 1913; forest, August, 1912; sweeping grass, October, 1912; from cells of *Scelephron letum*, Sm., October 19, 1912 and December 27, 1913. Sweeping foliage and grass in bed of Proserpine River (the latter dry), November 3 and 20, 1914. Townsville, forest, November 8, 1912. Ingham, sweeping boggy meadow bearing *Pandanus*, July 17, 1912.

ARANEUS DIMIDIATUS, L. Koch.

Epeira dimidiata, L. Koch, Die Arach. des Austr., i., 1871, p. 95, pl. viii., figs. 1, 1a.

Hab.—Gordonvale.

ARANEUS HUMILIS, L. Koch.

Theridium humile, L. Koch, Verh. der K.K. zool.-bot. Ges. Wien, 1867, p. 19.

Epeira humilis, L. Koch, Die Arach. des Austr., i., 1871, p. 107, pl. ix., figs. 1, 1a, 1b.

Obs.—A common species.

Hab.—Gordonvale, Pyramid Mt., at heights varying from 400ft. to 1500ft., September 9, 1912.

ARANEUS USUALIS, *Keys.*

Epeira usualis, Keys., Die Arach. des Austr., Suppl., 1887, p. 201, pl. xviii., figs. 2, 2a, 3, 3a.

Obs—The ova-sac is white, and the eggs pale yellow.

Hub.—Gordonvale, September 5, 1912, May 29, 1913, at 1,500ft.

ARANEUS EBURNUS, *Keys.*

Epeira eburnus, Keys., Die Arach. des Austr., Suppl., 1886, p. 148, pl. xii., figs. 4, 4a.

Hub.—Gordonvale.

ARANEUS TRANSVERSUS, *Rainb.*

Araneus transversus, Rainb., Mem. Q'land Mus., i, 1912, p. 197, figs. 11-14.

Hub.—Proserpine River, sweeping foliage and grass, open forest, November 3, 1912.

ARANEUS FASTIDIOSUS, *Keys.*

(Plate xxii., figs. 16, 17.)

Epeira fastidiosa, Keys., Die Arach. des Austr., Suppl., 1887, p. 183, pl. xvi., figs. 1, 1a.

Obs.—The ♂ of this species was described by Keyserling as quoted above, but the ♀ has apparently remained up to the present time unknown. One specimen, which I take to be the female of this species, is included in this collection, and is described and figured herewith. The ♂ was recorded from Rockhampton; my specimen was collected at Townsville.

♀ Cephalothorax 2.1 mm. long, 1.8 mm. broad; abdomen, 3.3 mm. long, 3 mm. broad (Pl. xxii., fig. 16).

Cephalothorax.—Obovate, dark brown, hairy. *Pars cephalica*, strongly arched, segmental groove distinct; *ocular area* broader than long, median group of eyes raised on a tubercle; *clypeus* broad, deep. *Pars thoracica* strongly arched, radial grooves distinct; *marginal band* broad. *Eyes.*—In three groups

of 2, 4, 2; median eyes large, seated at the summit of a tubercle, and disposed in the form of a trapezium; lateral eyes arranged in pairs, small and contiguous. *Legs*.—Short, strong, yellow with dark brown annulations, clothed with long hairs, and armed with long, fine spines; relative lengths: 1, 2, 4, 3. *Palpi*.—Short, strong, similar in colour and armature to legs. *Fulcrs*.—Dark brown, shining, strong, arched, tapering. *Maxillae*.—Normal, dark-brown, apices and inner angles creamy-white. *Labium*.—Short, broad, arched, dark brown, apex creamy-white. *Sternum*.—Shield-shaped, arched, outer angles dark brown; the central portion describes a broad, serrated, and foliated design of creamy-white. *Abdomen*.—Broadly ovate, strongly arched, pubescent, and boldly projecting over base of cephalothorax; superior surface greyish-brown, with a broken, snowy-white design in front, and a broad foliated design running down the middle, the anterior and lateral angles of which are snowy-white; immediately at rear of anterior design there are two very small but distinct dark brown spots, which latter are widely removed from each other; within the leaf-like design there are four distinct depressions or pits, of which the anterior pair are the largest and widest apart; at anterior extremity there is a broad, uneven dark brown (nearly black) transverse bar, which latter is strongly indented at the centre; sides concolorous with superior surface, but relieved by uneven dark brown lateral stripes (which latter are directed posteriorly), and by small groups of microscopic snowy-white spots; inferior surface dark brown with six snowy-white patches, the largest of which are the median pair, and the smallest the posterior. *Epigynum*.—A short, broad, somewhat pear-shaped, yellow process (Pl. xxii., fig. 17).

Hab.—Townsville, forest, January 3, 1913.

ARANEUS CYRTARACHNOIDES, *Keys*.

Epeira cyrtarachnoides, *Keys*., *Die Arach. des. Austr.*, Suppl., 1887, p. 181, pl. xv., figs. 8, 8a, 9, 9a.

Obs.—Most of the examples of this species were immature, and were taken by sweeping.

Hab.—Gordonvale, April 18, 1912 (immature); May 5, 1913, open forest; August 14, 1912; August 31, 1912, ♂ and ♀ from orbicular web in forest; August 31, 1912; forest, September 5, 1912.

ARANEUS ROTUNDULUS, Keys.

Epeira rotundula, Keys., Die Arach. des Austr., Suppl., 1887, p. 193, pl. xv., figs. 6, 6a, 7, 7a.

Obs.—One specimen in bad condition.

Hab.—Gordonvale, at 3,200ft.

ARANEUS FAVORABILIS, sp. nov.

(Plates xxii., figs. 18, 19.)

♀ Cephalothorax, 2.8 mm. long, 2.4 mm. broad; abdomen, 4.6 mm. long, 3.5 mm. broad (Pl. xxii., fig. 18).

Cephalothorax.—Obovate, straw yellow, shining. *Pars cephalica* strongly arched, moderately clothed with pale hairs, thoracic groove distinct; *ocular area* broader than long, fringed with a few rather long and very fine hairs; *clypeus* smooth, arched. *Pars thoracica* broad, pubescent, strongly arched, radial grooves distinct; *median fovea*, deep; *marginal band*, broad. *Eyes*.—Black, prominent; the four comprising the median group are the largest, and form a trapezium; lateral eyes arranged in pairs, small, contiguous. *Legs*.—Rather long, concolorous with cephalothorax, moderately clothed with short hairs, and armed with short, weak spines; metatarsal and tarsal hairs the longest; relative lengths; 1, 2, 4, 3. *Palpi*.—Rather long, similar in colour, clothing and armature to legs. *Fulces*.—Concolorous with cephalothorax, slightly projecting, strongly arched, tapering, moderately hairy, apices divergent; lower angle of furrow of each falx armed with three strong, coniform teeth, of which the one nearest the base of the fang is the strongest; at the rear of the third tooth from the fang, there is another rather short and coniform one; upper angle of the furrow of each falx armed with four coniform teeth, of which the two nearest the fang are much the strongest; in the groove between the two ridges there is a considerable number of small granular teeth irregularly distributed; *fang* long, strong, well curved, wine-red. *Maxille* and *Labium*.—Normal, moderately hairy, pale yellow. *Sternum*.—Concolorous with cephalothorax, shield-shaped, arched, clothed with rather long, yellowish hairs. *Abdomen*.—Ovate, overhanging base of cephalothorax, yellow, pubescent, superior

surface rather darker than sides, reticulated, ornamented down the middle with a distinct, but irregular, scheme of tracery, and speckled with white; sides of a paler yellow with the upper portion reticulated and relieved by rather large splashes of white; inferior surface dull yellow. *Epiptynum*.—A large transverse, high, bifurcated tubercle, with two deep, elliptical, lateral pits, separated by a broad, slightly elevated median ridge (Pl. xxii., fig. 19).

Hab.—Gordonvale, forest, September 9, 1912.

ARANEUS AGASTUS,³ sp. nov.

(Plates xxii., figs. 20, 21.)

♀ Cephalothorax, 3.3 mm. long, 2.5 mm. broad; abdomen, 5.1 mm. long, 4.2 mm. broad (Pl. xxii., fig. 20).

Cephalothorax.—Obovate, moderately clothed with long, fine hairs. *Pars cephalica* elongate, somewhat attenuated in front, yellow, strongly arched, sides declivous, thoracic groove distinct; ocular area broader than long; *clypeus*, pale yellow, arched, moderately deep, fringed with fine hairs. *Pars thoracica* broad, arched, central area concolorous with cephalic segment, sides dark brown, radial grooves distinct; *thoracic fovea* deep; *marginal band* concolorous with clypeus. *Eyes*.—Pearl-grey with black rings; the four comprising the median group are the largest and form a trapezium; lateral eyes small, arranged in pairs, contiguous, each pair seated at lateral extremity of outer angle. *Legs*.—Rather short, strong, yellow with dark brown annulations, clothed with fine hairs, and armed with numerous strong and moderately long spines; relative lengths: 1, 2, 4, 3. *Pulpi*.—Moderately long, strong, similar in colour, clothing and armature to legs. *Fulces*.—Yellow, strongly arched, coniform, moderately hairy, apices divergent. *Maxille* and *Labium*.—Normal, the bases dark brown, apices straw-yellow. *Sternum*.—Shield-shaped, lateral angles waved, reddish-brown generally, but yellow down the middle; surface uneven, ridged, the ridges terminating in tubercles between the coxæ. *Abdomen*.—Ovate, pubescent,

³ ἀγαστος = admirable.

strongly arched, overhanging base of cephalothorax, superior surface yellow-grey, with a broad, velvety-brown transverse band in front, the posterior angle of which is uneven, and edged with straw-yellow; this band is also narrowest, and deeply indented at the centre; laterally, and immediately at the rear of this transverse band there are two somewhat diamond-shaped spots bordered with straw-yellow; from near the centre there are two broad, sub-lateral wavy, velvety-brown longitudinal bands, which are bordered with straw-yellow, and are much the broadest in front; immediately in front of these bands there is a transverse, curved streak of dark velvety-brown bordered at rear with straw yellow; this transverse streak is interrupted at the centre; sides yellowish-grey also, but becoming much paler towards the ventral surface; inferior surface has a large, yellowish, lateral patch in front; but above, and at the rear of this there are prominent streaks of yellow and dark brown; the latter are again, however, mottled with yellow spots; middle area of inferior surface smoky-brown, relieved by two large creamy-white spots at middle (Pl. xxii., fig. 21). *Epigynum*—A short, pale, coniform process, broad at base and overhanging the *rima epigusteris*.

Obs.—The above was the only species of *Araneus* taken exclusively from the vicinity of a dwelling. A number of other examples, distinct from the above, and apparently referable to one species, were collected both in the forest, in the jungle, and under the verandah of an hotel at Gordonvale. The explanation of this is unquestionably that the "ballooning" habit was responsible. Unfortunately the specimens referred to were too immature for specific determination. Proximity to dwellings, however, has little or no importance; it is merely a fortuitous incident. *Araneus theis*, Walck., is often found not only in the jungle and forest, but often with its web in proximity—and even attached—to dwellings. Around Sydney, I have often seen *A. productus*, L. Koch, and *A. herione*, L. Koch, and other well-known similar forms, in like position; in fact their snares may be said to be placed where there is a fair chance of "game." Probably the form described above will hereafter be found reposing in a web far away from any building.

Hub.—Gordonvale, August 22, 1912, taken from web in front of window of dwelling.

ARANEUS DIANIPHUS,⁹ *sp. nov.*

(Plate xxii., figs. 22, 23, 24, 25.)

♂ Cephalothorax, 1 mm. long, 0.7 mm. broad; abdomen, 1.1 mm. long, 0.8 mm. broad (Pl. xxii., fig. 22).

Cephalothorax.—Obovate, yellow, smooth, shining. *Pars cephalica* arched, obtuse in front, thoracic groove distinct; *ocular area* broader than long; *clypeus* short, narrow. *Pars thoracica* strongly arched, radial grooves distinct; *median fovea* distinct, rather dark; *marginal band* narrow. *Eyes.*—Black, median four largest, and forming a trapezium; lateral eyes minute, contiguous. *Legs.*—Concolorous with cephalothorax, long, pilose, armed with short, fine, weak spines; relative lengths: 1, 2, 4, 3. *Palpi.*—Short, concolorous with legs, genital bulb complicated (Pl. xxii., fig. 23). *Fulces.*—Concolorous with cephalothorax, weak, coniform. *Maxillae* and *Labium.*—Normal, creamy-white. *Sternum.*—Shield-shaped, pale yellow, arched. *Abdomen.*—Ovate, overhanging base of cephalothorax, strongly arched, pale yellowish-grey, ornamented with a small, dark medium patch in front; from rear of this patch a faintly discernable thread-like line runs down the middle, and terminates in front of spinnerets; at a little below the anterior median patch there is a faint transverse line in eschelon; below this again, there are four short, broad, and distinct transverse bars, the first of these being the longest, and the fourth—which is seated in front of spinnerets—the shortest; sides, pale yellowish-grey; inferior surface concolorous, but having a rather darker longitudinal band running down the middle from the *rima epigasteris* towards spinnerets.

♀ Cephalothorax, 1.1 mm. long, 0.9 mm. broad; abdomen, 1.8 mm. long, 1.4 mm. broad (Pl. xxii., fig. 24).

⁹ *διανιφος* = marked with snow-white; in reference to abdominal ornamentation of ♀

Cephalothorax, *Eyes*, *Legs* and *Fulces* similar to ♂ in structure; the cephalothorax is, however, darker. *Maxillae* and *Labium*.—Normal; concolorous with cephalothorax. *Sternum*.—Concolorous also, shield-shaped, arched. *Abdomen*.—Ovate, overhanging base of cephalothorax, strongly arched; superior surface ornamented with a prominent design running down the middle; it is broad, uneven in outline, dark, smoky-yellow in front, but otherwise yellow-brown, irrorated with white; on each side of this ornamentation the colour is snowy-white, finely reticulated with yellow-brown; sides yellow-brown, suffused in parts with smoky-brown; inferior surface greyish-yellow. *Epigynum*.—A dark, rather large and strongly arched eminence, with two transversely oval pits, separated from each other by a very shallow ridge (Pl. xxii., fig. 25).

Hab.—Gordonvale, sweeping, forest, top of coastal range, 1,500ft., May 29, 1913.

ARANEUS DIAPHYPUS, var. XANTHOSTICHUS,¹⁰ var. nov. .

(Plate xxii., fig. 26.)

The form for which I propose the varietal name is larger than the type, and differs from it in abdominal ornamentation, but there can be no doubt as to its affinity, since in each example of the ♀, the epigynum is synonymous.

♀ Cephalothorax, 1.2 mm. long, 1 mm. broad; abdomen, 2 mm. long, 1.8 mm broad (Pl. xxii., fig. 26).

Cephalothorax, *Eyes*, *Legs*, and *Pulpi* similar to type; the first named is, however, slightly darker. *Fulces*, *Maxillae*, *Labium*, and *Sternum*.—Concolorous with cephalothorax. *Abdomen*.—Ovate, strongly arched, overhanging base of cephalothorax; superior surface snowy-white and closely and delicately reticulated with yellow; running down the middle there is a strongly defined scheme of yellow tracery; sides white, closely and delicately reticulated, and clouded with yellow patches; inferior surface dull yellow, with two small, but prominent, and finely reticulated sub-median patches of white immediately below epigynum. *Epigynum*.—As in type (Pl. xxii., fig. 25).

Hab.—Gordonvale, forest, from folded leaf, September 3, 1912.

¹⁰ ξανθοστιχος = yellow-streaked; in reference to scheme of tracery on abdomen.

ARANEUS COMPTUS, *sp. nov.*

(Plate xxii., figs. 27, 28.)

♀ Cephalothorax, 1.3 mm. long, 1.2 mm. broad; abdomen, 2 mm. long, 2 mm. broad (Pl. xxii., fig. 27).

Cephalothorax.—Broadly obovate, very slightly longer than broad. *Pars cephalica*, straw-yellow, with a few dark hairs at sides and base, strongly arched, thoracic groove distinct; *ocular area* broader than long; *clypeus* broad, moderately deep, dark brown. *Pars thoracica* straw-yellow, broad, well arched; radial grooves moderately defined; *median fovea* distinct; *marginal band* broad, straw-yellow. *Eyes*.—Pearl-grey lustre, ringed with black, the median group forming a trapezium; of this group the rear pair are slightly larger and wider apart than their anterior neighbours; lateral eyes minute and contiguous. *Legs*.—Strong, moderately long, straw-yellow, annulated with smoky-brown, pubescent, and armed with moderately long, strong spines; relative lengths: 1, 2, 4, 3. *Pulpi*.—Strong, rather long, straw-yellow, tarsi smoky-brown at tips; similar in clothing and armature to legs. *Fulcrs*.—Concolorous with cephalothorax, coniform, arched; *fangs* short, strong, well curved, yellow. *Mandibles* and *Labium*.—Normal; smoky-yellow with exception of apices and the inner angles of the former, which are very pale and nearly white. *Sternum*.—Shield-shaped, arched, pubescent, yellow, anterior and lateral angles somewhat darker. *Abdomen*.—Broadly ovate, obtusely acuminate at posterior extremity of upper surface, overhanging base of cephalothorax, pubescent, arched; superior surface dark yellowish-grey, ornamented with a broad leaf-like design, the outer angles or edges of which are black, or almost so; immediately in front there is a broad, nearly white, H-like design, the cross-bar of which is somewhat darker than the down strokes; below this design there is a faintly visible, longitudinal line, crossed by two faintly distinct transverse bars, and at the extremities of the latter a rather dark spot, of which the two lower ones are by far the most distinct; within the field of the leaf-like design there are a few nearly white spots; sides pale yellowish-grey also, but having in addition, on each side, a patch of smoky-grey; at the centre and about midway between the *rima epigasteris* and spinnerets, there are

two small, but prominent finely reticulated patches of snowy-white, and in front of each of these two small patches of smoky-yellow; spinnerets surrounded by a rather broad ring of smoky-yellow. *Epigynum*.—A long, reddish-yellow, arched, tongue-like process, which extends considerably beyond the *rima epigasteris*; laterally, there are two circular pits (Pl. xxii., fig. 28).

Hab.—Gordonvale, jungle, May 25, 1913, June, 1914. One adult and two immature examples.

ARANEUS COMPTUS, var. FUSCOCAPITATUS, var. nov.

(Plate xxii., figs. 28, 29.)

This variety agrees with type in size and general structure, and in the form of its *epigynum* (Pl. xxii., fig. 28), but differs very materially in colour and ornamentation. I describe it as follows:—

♀ *Cephalothorax*.—Broadly ovate, moderately hairy. *Pars cephalica* strongly arched, obtuse in front, entirely fuscous, segmental groove distinct; *ocular area* and *clypeus* as in type. *Pars thoracica* strongly arched, straw-yellow, radial grooves distinct; *median fovea* deep; *marginal band* broad, fuscous. *Eyes*.—Entirely black. *Legs*.—Long, moderately strong, pubescent, armed as in type; first and second pairs straw-yellow at base, thence fuscous; third and fourth pairs fuscous, annulated with yellow. *Palpi*.—Fuscous, annulated with yellow. *Fulcrs*.—Fuscous. *Maxillæ* and *Labium*.—Normal; fuscous at their base; apices pale yellow. *Sternum*.—Shield-shaped, arched, pale yellow, lateral angles fuscous. *Abdomen*.—Similar to type in form, and overhanging base of cephalothorax; superior surface fuscous, with two broad, transverse, dark yellowish-grey bars; in front there is a dark yellowish-grey patch which is rather longer than broad, and which connects with the anterior transverse bar; the patch just described is flanked on each side with a narrow whitish stripe, but has no cross-bar as in the case of the type; there are a large number of nearly black spots distributed over the upper surface; sides fuscous, each ornamented with a delicately, reticulated, irregularly shaped white spot, yellow markings and black spots; inferior surface has a broad, median patch of fuscous, the sides

of which are indented with yellow; spinnerets surrounded with a broad ring of fuscous, which ring forms part of the median patch. *Epigynum*.—As in type (Pl. xxii., fig. 28).

Hab.—Gordonvale, jungle, July 11, 1914.

ARANEUS ACUMINATUS, L. Koch.

Epeira acuminata, L. Koch, Die Arach. des Austr., i., 1871, p. 109, pl. ix., figs. 2, 2a, 2b.

In 1871, Dr. L. Koch, described and figured the ♂ of a species for which he proposed the name *Epeira acuminata*, since when there has been no record of the finding of the ♀. The specific name is a peculiarly appropriate one, seeing that not only is the cephalic segment strikingly acuminate but also the posterior extremity of the abdomen. Among the material collected by Mr. Girault there is a ♀ example which may prove to be that of the species quoted above, and it is here described tentatively under that name. The student will readily note the striking similarity of the cephalic segment of both sexes, Koch's species came from Rockhampton; Girault's specimen was collected at Gordonvale.

(Plate xxiii., figs. 30, 31.)

♀ Cephalothorax, 1.6 mm. long, 1.4 mm. broad; abdomen, 3 mm. long, 2.7 mm. broad (Pl. xxiii., fig. 30).

Cephalothorax.—Obovate, moderately hairy. *Pars cephalica* strongly arched, acuminate in front, segmental groove distinct; yellow-brown with a cream-yellow patch at base, and having two dark, finely pencilled lines running from between rear median eyes to anterior angle of cream-yellow patch; *ocular area* broader than long; *clypeus* very strongly curved, deep and sloping inwards. *Pars thoracica* broad, yellow-brown, strongly arched, radial grooves distinct; *marginal band* broad, pale yellow. *Eyes*.—Median group largest and forming a trapezium; the rear pair of this series is slightly larger than their anterior neighbours, and are seated at the edge of the overhanging angle of the cephalic segment; the two pairs forming the trapezium are only slightly removed from each other; the anterior pair of the median group are separated from each other by a space

equal to about twice their individual diameter, and the posterior pair by a space equal to about one-and-a-half their individual diameter; lateral eyes minute, contiguous. *Legs*.—Short, strong, yellow, annulated with smoky-brown, pilose, armed with moderately strong spines; relative lengths: 1, 2, 4, 3. *Pulpi*.—Moderately long, strong, yellow, similar in clothing and armature to legs. *Fulcræ*.—Concolorous with cephalothorax, arched, coniform. *Mucillæ* and *Lobium*.—Normal; smoky-brown, apices yellow. *Sternum*.—Shield-shaped, arched, dull yellow, relieved by a series of four creamy-white bars radiating from the centre; the first of these bars terminate at a point between the first and second coxæ; the second, between the second and third coxæ; the third, between the third and fourth; and the fourth at a point between posterior coxæ; the latter bar is broadest at its rear extremity; the radiating bars here described are slightly raised, thereby imparting an uneven appearance to the sternum. *Abdomen*.—Broadly ovate, arched, pilose, boldly projecting over base of cephalothorax; anterior angle slightly produced; superior surface uneven, yellow, finely and sparsely spotted with black, and having in addition four large, deep, black pits, the anterior pair of which are the smallest and the closest together; it is further ornamented by a prominent scheme of tracery and a broad leaf-like design, the outer angles of which are nearly black (Pl. xxiii., fig. 30); at posterior extremity there are two small tubercles, one seated below the other; sides cloudy yellow; inferior surface nearly black, relieved by two large, white, nearly round spots seated just below the *rima epigasteris*. *Epigynum*.—Dark brown, nearly black; in front of *rima epigasteris* it is strongly arched, and has two large lateral pits; from the latter there extends a long, tongue-like process, which latter is arched, reflexed laterally, and curved up slightly at the tip (Pl. xxiii., fig. 31).

Hab.—Gordonvale, November 14, 1911.

ARANEUS ANATIPES, Keys.

Epeira anatipes, Keys., Die Arach. des Austr., Suppl., 1887, p. 175, pl. xv., figs. 3, 3a, 4, 4a.

Hab.—Gordonvale, forest, August 27, and September 3 and 9, 1912.

ARANEUS APOBLEPTUS,¹¹ *sp. nov.*

(Plate xxiii., figs. 32-37.)

♂ Cephalothorax, 2 mm. long, 1.4 mm. broad; abdomen, 2 mm. long, 1.4 mm. broad (Pl. xxiii., figs. 32, 33).

Cephalothorax.—Ovate, pubescent; some specimens wholly rich mahogany-brown, others yellowish at the middle. *Pars cephalica* strongly arched, obtuse in front; *ocular area* broader than long; *clypeus* narrow, strongly curved, deep. *Pars thoracica* strongly arched, radial grooves distinct; *median fovea* deep; *marginal band* narrow. *Eyes*.—Normal. *Legs*.—Moderately long, strong, tapering, straw-yellow, with mahogany-brown annulations, pubescent, and armed with strong spines; relative lengths: 1, 2, 4, 3. *Palpi*.—Very short, femoral and tibial joints straw-yellow, pubescent; *genital bulb* large, yellow, but darker than preceding joints, clothed with long bristles (Pl. xxiii., fig. 34). *Fulces*.—Concolorous with cephalothorax, short, coniform, arched. *Maxillæ* and *Labium*.—Normal; the bases dark brown, apices yellow. *Sternum*.—Shield-shaped, arched, reddish-brown, anterior angle yellowish, lateral angles black. *Abdomen*.—Elongate, slightly overhanging base of cephalothorax, arched, sloping downwards towards middle, and then ascending towards posterior extremity, where it terminates in a somewhat gibbous eminence, beneath, and on each side of which, there is a small tubercle; posterior extremity sloping downwards and inwards until spinnerets are reached (Pl. xxiii., fig. 35); superior surface in some examples yellow, with black markings in front, and ornamented at the centre with two prominent silvery spots, while the posterior extremity gleams like mother-o'-pearl; other examples are yellow-brown with silvery spots, while some are dark brown (nearly black) with bright silvery marks and patches; sides and under surface, in nearly all specimens before me, yellow with dark markings.

♀ Cephalothorax, 2 mm. long, 1.5 mm. broad; abdomen, 5.3 mm. long, 3.4 mm. broad (Pl. xxiii., fig. 36).

Cephalothorax.—Obovate, pubescent, shining, dark yellow. *Pars cephalica* arched, sides declivous, segmental grooves distinct; *ocular area* broader than long, *clypeus* narrow, luteous. *Pars thoracica* strongly arched, lateral and posterior angles finely pencilled with black; radial grooves distinct; *median fovea* profound; *marginal band* broad, luteous. *Eyes*.—Of a pearl-grey lustre, ringed with black; normal. *Legs*.—Moderately long, strong, pubescent, armed with rather stout spines golden straw-yellow, femoral joints and patellæ annulated with dark brown (nearly black); other joints annulated with smoky-yellow; relative lengths: 1, 2, 4, 3. *Pulpi*.—Rather short, straw-yellow, similar in clothing and armature to legs. *Mandibles* and *Labium*.—Normal; dark brown at base, apices yellow. *Sternum*.—Shield-shaped, arched, dark brown, relieved in front by a transverse bar of straw-yellow; in addition to this bar there are four lateral, and one posterior, concolorous nodules. *Abdomen*.—As viewed from above gibbous at both extremities, arched, and overhanging base of cephalothorax; superior surface dark brown (nearly black) in front, and ornamented with a broad, silvery band of uneven outline running down the middle; from just beyond the middle this silvery ornamentation, which is finely reticulated with dark brown, is continued down the side (Pl. xxiii., fig. 37); posterior extremity terminated by three prominent tubercles, of which the median is the largest; sides similar in colour to superior surface. *Epiygnum*.—Dark brown, raised, somewhat like a horse-shoe in outline, and having two lateral pits and a reflexed tongue-like process running down the middle. In the different examples before me this tongue-like process varies somewhat in length, but in none does it extend beyond the *rima epigusteris*.

Obs.—The ♀'s vary considerably both in size and colouration, but all are remarkably beautiful. In some examples the abdomen is exceedingly brilliant and metallic, whilst in others it is very dark, almost black, with silvery patches at the sides only, and having a yellowish-grey band down the middle; another specimen has its sides silvery-grey, reticulated with black, and a dark, yellow-brown band running down the middle. Then, again, the cephalothorax in some instances is of a golden straw-yellow, and in others a rich mahogany-brown. The legs of the different examples also differ widely in intensity of colouration, some being strongly annulated, and some

only faintly so. Moreover, the epigynum, whilst agreeing in all examples in the main features of its structure, displays considerable variation, principally in the length of its tongue-like process. In fact, from an excellent series—and all from the one area—it is difficult to find, in either sex, two examples exactly alike, while some—in point of ornamentation at any rate—are strikingly different.

Hub.—Gordonvale: females from orbicular webs, and males chiefly by sweeping in forest and jungle. Two examples were taken from the window of a dwelling. All specimens were collected during the months of May, June and July in 1912 and 1913.

ARANEUS ARGENTARIUS, *sp. nov.*

(Plate xxiii., figs. 38 and 39.)

♀ Cephalothorax, 1 mm. long, 0.7 mm. broad; abdomen, 1.8 mm. long, 1 mm. broad.

Cephalothorax.—Obovate, shining, dark brown, nearly black. *Pars cephalica* arched, pubescent, segmental groove distinct; *ocular area* broader than long; *clypeus* moderately deep. *Pars thoracica* arched, radial grooves distinct; *median fovea* deep; *marginal band* moderately broad, concolorous with cephalothorax. *Eyes.*—Normal. *Legs.*—Short, strong, hairy, spined, pale yellow, annulated with greyish-brown bands; relative lengths: 1, 2, 4, 3. *Palpi.*—Short, strong, similar in colour, clothing and armature to legs. *Falces.*—Short, strong, arched, apices apart, concolorous with cephalothorax. *Maxillae* and *Labium.*—Normal; concolorous with falces. *Sternum.*—Concolorous with foregoing, shield-shaped, arched, surface uneven. *Abdomen.*—Boldly projecting over base of cephalothorax, anterior and posterior extremities obtuse, widest at the middle; just beneath and in front of posterior extremity there are two small but prominent tubercles; superior surface heavily plated with silver and delicately reticulated, somewhat depressed at middle; sides and posterior angle dark brown, nearly black, relieved by splashes of silver; inferior surface dark brown (Pl. xxiii., fig. 39). *Epigynum.*—A transverse plaque with two lateral pits.

Hub.—Gordonvale, taken from nests in low forest August 30, 1912.

(*Genus* *Carepalxis*, L. Koch.

CAREPALXIS BILOBATA, Keys.

Carepalxis bilobata, Keys., Die Arach. des Austr., Suppl., 1886, p. 118, pl. ix., figs. 4, 4a.

Hub.—Cooktown, from nest of *Sceloporus*, sp., February 6, 1912; Pentland, September, 1914.

CAREPALXIS BEELZIBUB, von Has.

Epeira beelzibub, von Has., Tijds. Ent., viii., 2, p. 240, pl. xii., figs. a, b, c.

Hub.—Pentland, September, 1914. Originally recorded from Victoria.

CAREPALXIS LICHENSIS, sp. nov.

(Plate xxiii., figs. 40, 41, 42.)

♀ Cephalothorax, 1.6 mm. long, 1 mm. broad; abdomen, 2.5 mm. long, 2.5 mm. broad, depth from apex to spinnerets 3.4 mm. (Pl. xxiii., figs. 40, 41).

Cephalothorax.—Ovate, bilobed, shining, pilose. *Pars cephalica* strongly arched, obtuse, dark mahogany-brown, distinctly paler in region of median eyes; *ocular area* broader than long; *clypeus* strongly curved, deep. *Pars thoracica* strongly arched, dark mahogany-brown; *median furca* profound; *marginal band*, broad, dark brown. *Eyes*.—Distributed over three groups of 2, 4, 2; median group in the form of a trapezium; of this series the anterior pair are separated from each other by a space equal to about once their individual diameter, whilst their posterior neighbours are contiguous to each other; lateral eyes minute, touching. *Legs*.—Short, strong, tapering, hairy, spined, straw-yellow with dark brown annulations; relative lengths: 1, 2, 4, 3. *Pulpi*.—Short, strong, straw-yellow, similar in clothing and armature to legs. *Fulces*.—Shining, concolorous with *pars cephalica*, strongly arched, tapering, inner angles fringed with short hairs. *Maxillæ*.—Short, broad, arched, inclining inwards, base and outer angles dark brown, inner angles and apices pale yellow. *Labium*.—Short, broad, arched, concolorous with foregoing.

Sternum.—Broad, shield-shaped, arched, posterior extremity acuminate, anterior angles and sides straw-yellow, median area dark brown; two large tubercles in front, two more on each side, and one at apex; the tubercles straw-yellow. *Abdomen*.—Overhanging base of cephalothorax, strongly arched, subglobose, and furnished with two large acuminate humeral tubercles, the inner sides of which are arched, and the outer depressed; in form the tubercles suggest the ears of a cat; the surface of the abdomen both above, laterally and beneath is dark brown, nearly black, with irregular pale yellow and greyish markings of various sizes; the general colour and scheme of ornamentation imparts a decidedly lichen-like appearance. *Epigynum*.—A pale yellow tubercle, arched, somewhat parallel sided, with deep pit, protected by an overhanging curved lip.

“Ova-sacs suspended in a horizontal line in forest tree” (collector’s note). There are three of these, each of which is spherical, closely woven, but surrounded with a quantity of loose fibrous silk. Each egg-sac is about half the size of an ordinary pea.

Hab.—Gordonvale, forest, May 30, 1913.

Genus GASTERACANTHA, *Sund.*

GASTERACANTHA SACERDOTALIS, *L. Koch.*

Gasteracantha sacerdotalis, *L. Koch*, *Die Arach. des Austr.*, i., 1871, p. 198, pl. xviii., fig. 1.

Obs.—Four specimens were collected, and these show considerable colour variation.

Hab.—Gordonvale, forest, June 30, August 22, and September 9, 1912.

GASTERACANTHA TAENIATA, *Walck*

Plectuna taeniata, *Walck.*, *Hist. Nat. des Ins.*, Apt., ii., 1837, p. 169.

Gasteracantha violenta, *L. Koch*, *Die Arach. des Austr.*, i., 1871, p. 5, pl. i., fig. 3.; *Butl.*, *Trans. Ent. Soc.*, 1873, p. 161.

Gasteracantha taeniata, L. Koch, Die Arach. des Austr., i., 1873, p. 10.

Obs.—Two perfect and one badly broken specimens were collected, in addition to one diminutive and immature form. In his "Monographic List of the Gasteracantha," Butler (*supra*) says:—"Our dried examples of this species are much broken, and show no trace of the dark bands mentioned in Koch's description; but the large depressed spots of the second series seem rather continuous with the first than the third series, as in *G. taeniata*." In the perfect specimen before me the two dark bands referred to by Koch are decidedly distinct. The species is apparently somewhat variable; its range is Papua, Queensland, Northern N.S. Wales, New Caledonia and the Falkland Isles.

Hab.—Gordonvale, July and September, 1912.

Genus Cyrtarachne, *Thor.*

CYRTARACHNE SETOSA, *Keys.*

Cyrtarachne setosa, *Keys.*, Die Arach. des Austr., Suppl., 1886, p. 98, pl. vii., fig. 5.

Hab.—Gordonvale, forest, August 14, 1912; one immature specimen. The original locality for this species was Sydney, N.S. Wales.

Genus Ordgarius, *Keys.*

ORDGARIUS MONSTROSUS, *Keys.*

Ordgarius monstrosus, *Keys.*, Die Arach. des Austr., Suppl., 1886, p. 114, pl. ix., figs. 2, 2a-2c.

Hab.—Gordonvale, forest, April 27, 1913.

Genus Poltys, *C. Koch.*

POLTYS CORONATUS, *Keys.*

Poltys coronatus, *Keys.*, Die Arach. des Austr., Suppl., 1886, p. 128, pl. x., figs. 2, 2a.

Hab.—Gordonvale, forest, October 24, 1912.

POLTYS ? MULTITUBERCULATUS, Rainb.

(Plate xxiii., fig. 43.)

Poltys multituberculatus, Rainb., Rec. Austr. Mus., iii., 4, 1898, p. 82, pl. xviii., figs. 2, 2a, 2b.

Obs.—In 1898, as quoted above, I described and figured an Argiopid, for which I proposed the name *Poltys multituberculatus*. In the Girault collection there are two immature specimens which, although different in abdominal ornamentation, and having very microscopic tubercles, I do not feel justified in describing as new. Each of these specimens has a prominent coniform tubercular projection at the summit of the abdomen as in *P. multituberculatus*, and numerous tiny tubercles distributed over its upper surface and sides, in much the same manner as in the type of my Cooktown species. If the student will compare fig. 43, pl. xxiii., given herewith, with that quoted above, he will note both similarity and difference. In the two specimens under discussion there is a large rich brown longitudinal bar running down the middle for fully two-thirds the length of the abdomen; at its posterior extremity it is joined by a concolorous transverse bar, the two thus forming an inverted capital \perp . Both bars are somewhat wavy in outline, and the apex of the prominent abdominal tubercle is slightly cleft. It is quite possible that the form under review may be a distinct variety of *P. multituberculatus*, or even an undescribed species, but as the larger of the two examples in front of me is probably only about half-grown, and does not, of course, exhibit an *epigynum*, it is better to let the matter remain in abeyance for the present.

Hab.—Gordonvale, two specimens, both immature; the smaller one was collected by "sweeping" at top of coastal range, at 1,500ft., May 29, 1913, and the larger from an orb-web in forest, August 31, 1912.

POLTYS MICROTUBERCULATUS, sp. nov.

(Plate xxiii., fig. 44.)

♀ Cephalothorax 3.5 mm. long, 2.8 mm. broad; abdomen 5.1 mm. long, 4.4 mm. broad (Pl. xxiii., fig. 44).

Cephalothorax.—Obovate, bilobed, yellow, clothed with long hairs. *Pars cephalica* strongly arched, obtusely acuminate,

constricted, sloping sharply forward and then slightly ascending; *ocular area* equally as long as broad; *clypeus* narrow. *Pars thoracica* strongly arched, somewhat higher than cephalic segment, radial grooves and *median fovea* distinct; *marginal band* broad, slightly paler than cephalothorax. *Eyes*.—Distribution normal; of a pearl-grey lustre, ringed with black. *Legs*.—Moderately long, strong, tapering, hairy, spined, yellow; tibiae, metatarsi, and tarsi annulated with brown; relative lengths: 1, 2, 4, 3. *Palpi*.—Moderately long, strong, yellow, similar in colour and clothing to legs. *Falces*.—Concolorous with cephalothorax, conical, apices divergent; *fang*, short, well curved. *Maxillae*.—Short, broad, arched, apices somewhat truncated; the latter, as well as inner angles, pale yellow, bases much darker. *Labium*.—Concolorous with maxillae, short, broad, arched, apex rounded. *Sternum*.—Broadly cordate, flat, concolorous with cephalothorax, sparingly hairy. *Abdomen*.—Broadly ovate, overhanging base of cephalothorax, yellowish-grey, and flecked with small but prominent dark (nearly black) markings, and numerous small, dark brown spots; dorsal area rather flat, or but very slightly arched; sides well rounded, and finely pencilled with dark brown; superior surface and sides rough and uneven, and furnished with numerous very small tubercles, the latter imparting a decidedly shagreened appearance. *Epigynum*.—A small yellowish tubercle with two lateral pits, and a short, broad, projecting tongue-like process.

Hub.—Gordonvale, forest, taken from folded leaves, September 3, 1912.

(Genus *Dolophques* Walck.

DOLOPHONES TESTUDINEA, L. Koch.

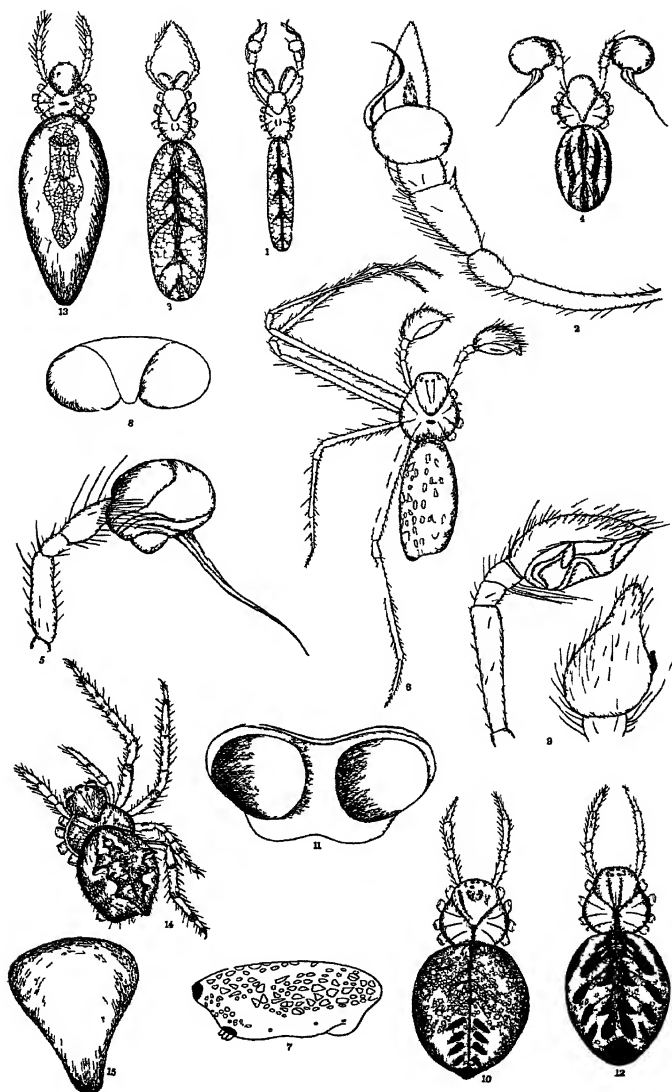
Tholia testudinea, L. Koch, Die Arach. des Austr., i., 1871, p. 20, pl. ii., figs. 2, 2a-2c; *op. cit.*, p. 204, pl. xviii., figs. 4, 4a, 4b.

Obs.—Only one specimen of this genus was collected, namely, *D. testudinea*, and that an immature and damaged one.

Hub.—Pentland, September, 1914.

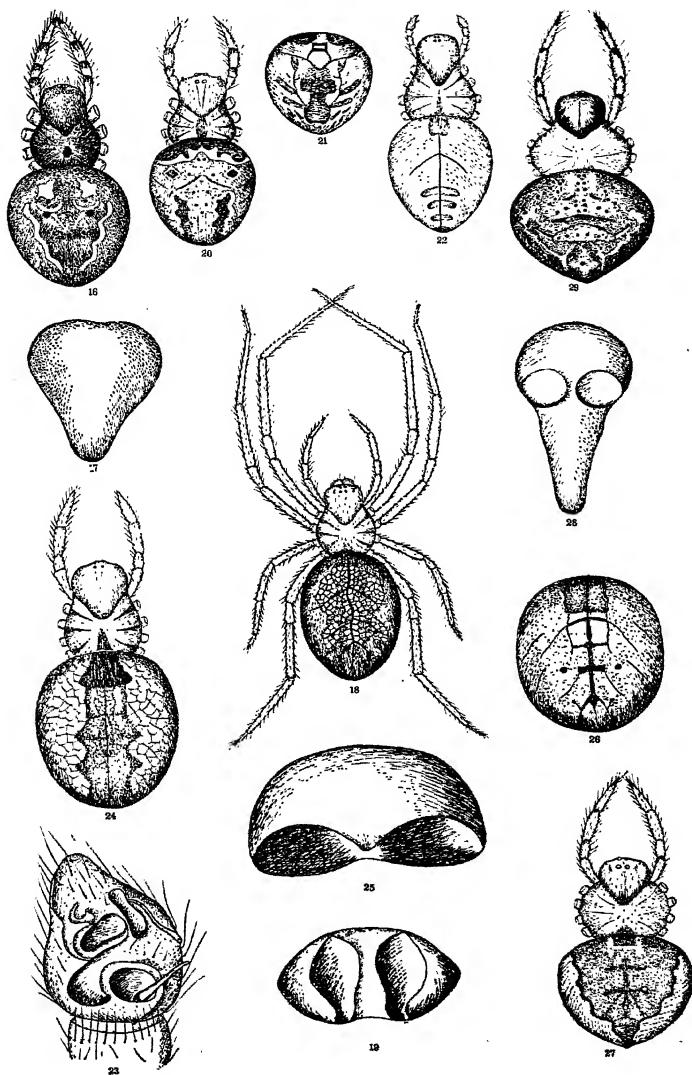
EXPLANATION OF PLATE XVI

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- Fig 1 *Tetragnatha lepida*, Ramb, ♂
 2 " , ♂ palpus
 , 3 " " ♀
 , 4 *Meta ornata*, Ramb ♂
 , 5 " " " ♂, palpus
 6 *argentio-punctata*, Ramb, ♂
 , 7 , " , ♀, abdomen
 " 8 " " " epigynum
 " 9 *Singotypa melanopyga*, L Koch ♂, palpus
 " 10 *Deliochus pulchra*, Ramb, ♀
 " 11 epigynum
 " 12 " *melania*, Ramb ♀
 13 *Agirope probata*, Ramb, ♀
 , 14 *Aranens acachmenus*, Ramb, ♀
 , 15 epigynum



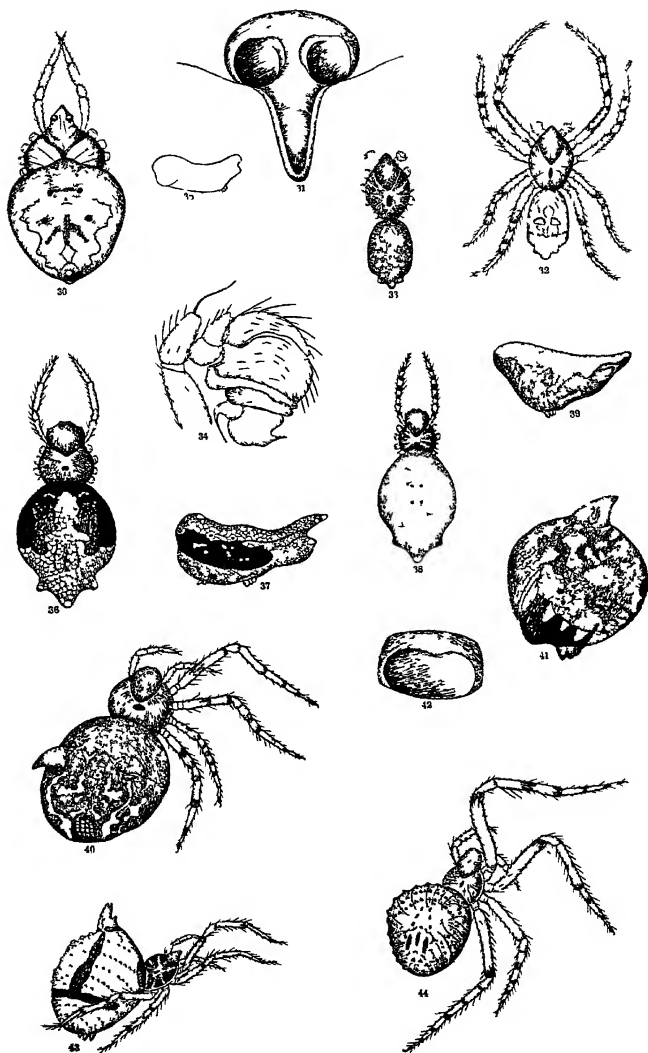
EXPLANATION OF PLATE XXII.

- Fig. 16. *Aranens* ? *fastidiosus*, Keys., ♀
- „ 17. „ „ „ epigynum
- „ 18. „ *favorabilis*, Rainb., ♀
- „ 19. „ „ „ epigynum
- „ 20. „ *agastus*, Rainb., ♀
- „ 21. „ „ „ abdomen, underside
- „ 22. „ *dianiphus*, Rainb., ♂
- „ 23. „ „ „ ♂ palpus
- „ 24. „ „ „ ♀
- „ 25. „ „ „ epigynum
- „ 26. „ „ *var. xanthostichus*, Rainb., ♀
- „ 27. „ *comptus*, Rainb.
- „ 28. „ „ „ epigynum.
- „ 29. „ „ *var. fuscocapitatus*, Rainb., ♀



EXPLANATION OF PLATE XXIII.

- Fig 30 *Aianeus* ? *acuminatus*, L Koch, ♀
 „ 31 „ „ „ epigynum
 „ 32 „ *apobleptus*, Rainb., ♂
 „ 33 „ „ „ *ret*
 „ 34 „ „ „ ♂, palpus
 „ 35 „ „ „ ♂, abdomen in profile
 „ 36. „ „ „ ♀
 „ 37 „ „ „ ♀, abdomen, side view
 „ 38. „ *argentarius* „ ♀
 „ 39. „ „ „ ♀, abdomen, side view
 „ 40. *Carepalxis* *lichenis* „ ♀
 „ 41 „ „ „ ♀, abdomen, side view
 „ 42 „ „ „ epigynum
 „ 43 *Poltys* ? *multituberculatus*, Rainb, ♀
 „ 44 „ *microtuberculatus*, „ ♀



THE BIRDS OF COOLABAH AND BREWARRINA,
NORTH-WESTERN NEW SOUTH WALES,

By

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The following notes were made at Coolabah, between the 5th and 14th of October, 1915, and those at Brewarrina between the 15th and 22nd of the same month.

Ascertaining last October from a twenty-five years' resident of North-western New South Wales, that the weather conditions in that part of the State were apparently favourable for a collecting tour, I determined to spend my annual leave for 1915, as far as possible, equally at Coolabah and Brewarrina. Coolabah, on the main western line, four hundred and twenty-nine miles north-west of Sydney, is situate in the red soil country, having no natural watercourse, or permanent water, if we except a small gilguy or soak here and there, but which had entirely dried up at the time of my visit, the residents being dependent upon artificially formed tanks and dams for their storage of water.

The principal flora of the open forest lands of Coolabah put me very much in mind of that of the country around Moree in Northern Central New South Wales, the gum (*Eucalyptus*) and Apple (*Angophora*) predominating, and in the scrubs, the Wilga (*Geigeria parviflora*) and pines (*Callitris*, *sp.*).

For some time prior to reaching Coolabah, the shapely Sour Plum or "Colane" of Western New South Wales, or "Grouie" (*Owenia acidula*) of the Moree District, were much in evidence, resembling as one passed them in the train, the symmetrical artificial trees, found in a child's "Noah's Ark," and not unlike the introduced Pepper plant (*Schinus molle*) common throughout the inland portions of Australia, but usually more squat in appearance. I did not observe *Owenia acidula* either at Coolabah or Brewarrina, but at both places was informed that it occurred in the neighbourhood.

At Coolabah I learned that the district was suffering from the effects of a drought, in fact it was evident some time before reaching it, but not nearly so pronounced as in 1914. On each side of the railway line, particularly on the stock route, the trees appeared to be growing in a desert of red sandy soil, not a blade of natural grass being visible anywhere. At the Government Tank on the Girilambone side of the railway line, with the exception of the Rose-breasted Cockatoo (*Cacatua roseicapilla*), Barnard's Parrakeet (*Barnardius barnardi*), and the Yellow-throated Miner (*Myzantha flavigula*) I saw no birds worthy of note that could not be found in the neighbourhood of Sydney. On the way up a flock of the introduced Starling (*Sturnus vulgaris*) was noted as far west as Trangie, three Emus (*Dromæus novæ-hollandiæ*) were observed about two hundred yards from the railway line shortly after passing Grahweed, and it is almost needless to add that the acclimatised House Sparrow (*Passer domesticus*) was seen nearly everywhere, about station buildings, goods sheds, and stables, etc.

On the morning following my arrival I went into a Wilga scrub immediately at the rear of the hotel but saw very few birds, being out three-quarters of an hour before getting a shot. Visiting a dam I was told of, about a mile and a half from the railway station, and where late in the afternoon one would naturally expect to find birds coming to drink, I was surprised to meet with only three common species—the Magpie-Lark (*Grallina picata*), the Black and White Fantail (*Sauoloprocta melaleuca*), more popularly known as the "Willy-Wagtail," and the Yellow-throated Miner (*Myzantha flavigula*).

On Monday, the 11th October, official duties necessitating First-class Constable W. C. Wrightson visiting Bundong, the residence of Mr. Victor Hall, about fifteen miles from Coolabah, he invited me to go with him. This necessitated our driving through Willeroon Station, where there was a marked improvement in the appearance of the country and where several species of birds were obtained, or noted, that were not met with at Coolabah; among the latter, three Emus (*Dromæus novæ-hollandiæ*) which were disturbed from some bushes as we drove slowly past. At Bundong Homestead we were kindly received by Mr. V. B. Hall, Junr., and his Mother.

Although I walked miles every day, it was remarkable that most of the birds were obtained in the Wilga scrub close to the hotel, or immediately around the railway station. At the time of my visit, the Welcome Swallow (*Hirundo neoxena*) was feeding young in a nest in the kitchen of the hotel, the Yellow-throated Miner (*Myzantha flavigula*) was similarly engaged at a nest in a tree opposite my bedroom window, while a White-plumed Honey-eater (*Ptilotis penicillata*) was sitting on a nest in the drooping leafy twigs of a gum near the tank.

On the 14th, just before leaving for Brewarrina, I was asked to go and see a bird-catcher's call birds in the stables of the hotel. Among them he had a beautifully plumaged adult male Barraband's Parrakeet, or "Green-leek" (*Polytelis barrabandi*) which he considered rare, also a Leadbeater's Cockatoo, or "Major Mitchell," (*Cacatua leadbeateri*), a female Red-winged Parrot or "Bello-wing" (*Ptilistes erythropterus*), and some Warbling Grass-Parrakeets or "Budgerigar's" (*Melopsittacus undulatus*).

At Brewarrina early next morning I was awakened by the twittering notes of birds, and on opening my bedroom door which led on to the balcony, found it proceeded from a half dozen Tree Swallows (*Petrochelidon nigricans*), perched on the telegraph wires, close by. Afterwards I discovered this species was the commonest bird in the town.

Brewarrina, on the Darling River, five hundred and eighteen miles north-west of Sydney, and the longest railway journey in the State, is in the black soil country.

Chief among the sights of Brewarrina is its ancient aboriginal fish-traps, made of stones, of the formation of which, no tradition has been handed down to the present dusky inhabitants of the soil. These traps are known locally to the residents of Brewarrina as "The Fisheries," a somewhat misleading term, but in such general constant use, that I shall here adopt it. This series of fish-traps or "yards" is built in the Darling River, at a place known as "The Rocks," a natural broken rocky barrier, close to Bathurst Street, the main thoroughfare of the town, reaching from nearly one side of the river to the other, and extending upwards for about a distance of three hundred yards. When I first saw "The Fisheries" on

Friday, the 15th October, 1915, they were nearly submerged by the freshes on the river, caused by the rain on the two previous days and it was not until the 19th October that the water had subsided enough to take the accompanying photographs, which will give one a better idea of them than pages of description. One can trace these structures, more or less in a state of disrepair, except those shown in Plates xxiv., xxv., and xxvi., which are the only ones at present being worked, for about three hundred yards, the upper portion terminating a little below the Chinamens' garden on the western bank. Another picture taken below Plate xxiv., completes the principal part of "The Fisheries," as they now stand. These fish-traps or "yards" are principally of irregular shape, chiefly of bent elongate-pear form, while others are oval or nearly circular and three or four, or more, are often constructed together and attached again to a long wall of stones which extend in some instances nearly across the river. The walls of the traps are formed entirely of stones, some are very large, as will be seen by the photographs, but the greater part average from nine to eighteen inches in diameter, a hole being left at the widest part of each trap for the fish to enter, which they usually do when swimming up stream, many others being caught in them when the river is in flood, but which of course could only be taken when the river had subsided. At the time of my visit there was only one pure blooded aboriginal watching the traps, who lived in a frail erection on the river bank, only a few yards away from them. He informed me that he belonged to the Cobar tribe, was sixty-seven years of age, and known as "Steve Shaw"; had a wife in the Brewarrina Aboriginal Mission Station, where he had been until eight weeks before. I visited him everyday, in the early morning, but usually he had examined the "yards" before I got there, at the first break of day. Formerly the entrance hole in the wall was plugged with one or more stones, and a small meshed round net was used in catching the fish in the trap. Now the egress was blocked with a small wire covered iron wheel, and the lengthened deep purse-like net, wherein to put the fish, and if necessary, keep them alive, was made of the ordinary galvanised meshed fencing wire. His *modus operandi* after closing the hole in the wall, which was generally in the widest part of the trap, and in the deepest water, was to poke about the trap, usually at the sides and among the stones, with a

piece of straight iron wire, which he carried in his right hand, and gradually drove the fish, if any, into the shallow water in the narrow bent end of the trap, where he secured it in the beforementioned wire purse-like net. "Steve" met with varying success; on the first morning after my arrival he secured five fair-sized Murray Cod (*Oligorus macquariensis*), the next day nothing, he informing me "the fish were all on the other side of the river"; the day following he told me he had caught only a few Bony Bream (*Dorosoma erebi*), which he had cooked and eaten, and the day after that, some Fresh-water Cat-fish (*Copidoglanis tandanus*). On the 19th October, the day I was photographing "The Fisheries," "Steve" was fortunate enough to secure a "Yellow-belly" or Golden Perch (*Plectroplites umbiguus*), about five pounds in weight, which I photographed—"Steve" holding it up in his left hand, in one of the yards—but the fish is hardly discernible in the picture (Plate xxvi). There are several flat grassy patches in the river, adjacent to "The Fisheries," which, together, with the surrounding rocks and stones are resorted to by birds, principally fish eating ones. Conspicuous among them was a pair of White Ibis (*Ibis molucca*), sometimes to be seen standing in the water watching for their prey, or motionless, resting on one leg, on the bank. From the tops of stones, the large Black Cormorant or "Shag" (*Phalacrocorax carbo*), sleek in body, slipped noiselessly into the water, probably anxious to secure some passing fish, disappearing for some seconds, and half rising to the surface again some distance away; the little Black and White Cormorant (*Phalacrocorax melanoleucus*) was also noted "fishing" in the river. The higher parts of the river above "The Rocks," I was informed, was called the Barwon, and that below on the lower level the Darling. The rush of water as it passed through the stone walls at the latter point could be heard over two hundred yards away, in a low dull murmur at night, when all was otherwise quiet. The river yielded not only fish as food to the aborigines, but the large Fresh-water Mussel (*Diplodon (Unio) angusi*) and the Black River Tortoise (*Emydura macquarie*), occasionally caught on fishing lines. The carapace of one caught in the Barwon, at the Aboriginal Mission Station, nine miles from Brewarrina, measuring 10.5 inches in length by 8 inches in breadth, was subsequently presented by the then Manager, Mr. Geo. F. Evans, to the Trustees.

When in Brewarrina, some of the residents told me that nothing like "The Fisheries" existed elsewhere in any part of Australia. This, however, I knew to be incorrect, for similar structures have been described, as well as "The Fisheries" at Brewarrina, many times, in books, scientific proceedings, magazines, and in newspapers. Moreover, Mr. R. Etheridge, the Curator, on my return, told me of a similar, but smaller structure lower down the Darling, about thirty-two miles below Louth, that he had visited in 1903, in company with Mr. A. W. Mullen, Surveyor and Inspector to the Western Land Board, Bourke. These fish-traps are at a point on the river, between Newfoundland and Curranyalpa Stations.

Fifty-one years ago, Mr Gideon S. Lang, described these fish-traps at Brewarrina in a lecture delivered by him at St. George's Hall, Melbourne, on the 12th July, 1865, in aid of the Leichhardt Search Fund,¹ where he states:—"The great weir for catching fish, on the Upper Darling, called 'Brewarner,' is, both for conception and execution, one of the most extraordinary works recorded of any savage tribe, and independent of another described by Morrill, the shipwrecked mariner, who passed seventeen years among them, is quite sufficient to prove their capacity to construct works on a large scale, and requiring combined action. This weir, at 'Brewarner,' is about sixty-five miles above the township of Bourke. It is built at a rocky part of the river, from eighty to a hundred yards in width, and extends about a hundred yards of the river course. It forms one immense labyrinth of stone walls about three or four feet high, forming circles from two to four feet in diameter, some opening into each other, forming very crooked, but continuous passages, others having one entrance only. In floods as much as twenty feet of water sweeps over them, and carries away the tops of the walls; the inner parts of the walls, however, are so solidly built with large heavy stones, which must have been brought from a considerable distance, and with great combined labour, that they have stood every flood from time immemorial. Every summer this labyrinth is repaired, and the fish, in going up or down the river, enter it, get confused in its mazes, and are caught by the blacks by hand in immense quantities."

Relative to Plate xxvii., a plan of "The Fisheries," I transcribe a copy of the following hitherto unpublished Report given to the Curator of the Australian Museum, by Mr. A. W. Mullen, Surveyor, etc to the Western Land Board, Bourke—"Survey of 'The Fisheries,' in the Darling River, opposite the town of Brewarrina, New South Wales.—Bourke, 17th July, 1906.—'In compliance with verbal instructions from the Western Land Commissioners, I have the honour to transmit herewith a plan and tracing of compass survey of 'The Fisheries' at Brewarrina, made on the 15th June, 1906'":—

"These fish-traps are supposed to have been constructed by the aborigines, but so long ago that all tradition is lost, even the oldest local blackfellow—'King Watty of the Fisheries'—cannot tell how they originated. As far back as white men can remember, the aborigines have used these traps, and to this day they are kept in repair and fish are caught in them by the local aborigines. The traps are constructed of loose stones and small boulders, arranged in four rows or dams on the natural rocky bar in the bed of the Darling River, opposite the town. The surface of the water on the upper side of the bar is about eleven feet above the surface of water on the lower side of the bar when the river is low, so that when a fresh occurs the water runs rapidly over the bar and through the traps, giving fish many obstacles to surmount in ascending the stream, while the water is shallow. The fish are caught in these traps when the water is running through them and just exposing the tops of stones. The stones in the traps are piled up to a height of from one to two feet, the bases being about double the height. As far as I know, only fish ascending the stream are caught, they enter the traps at the gaps left on the lower sides of the widest portions of the traps in which the water is deeper than in the narrow ends of traps. When the stream is at a suitable height for trapping fish, the aborigines are always on the watch, and when a fish is found to have entered a trap, it is driven into the shallow, narrow end of the trap and knocked on the head with a stick."

In answer to queries of mine, Mr. Mullen writes me as follows, under date 18th July, 1916:—"I do not know of any fish-traps now, other than those at Brewarrina, but the late Mr. William Crowley, of Collywarry, told me there were stone fish-traps on

rocks in the Barwon River near that station, and about twenty-five miles above Brewarrina, but they have now disappeared." Relative to those I saw in the Darling River, at Newfoundland, below Louth, in company with Mr. Etheridge, in 1903, I enclose the following letter from Mr. Hubert Murray, of Bellsgrove, Louth:—"Re the aboriginal fish-traps near Newfoundland, they are not in existence now, having gradually washed away. The principal yards were about three miles below Newfoundland and some smaller ones about five miles lower down."

These fish-traps, formed of boulders and stones, relics of a bygone age, probably before the advent of the white man in Australia, were used throughout the greater of the eastern portions of the continent, being found in New South Wales, Queensland, and the Northern Territory. "The Fisheries" at Brewarrina, a splendid specimen, even now, of concerted and combined aboriginal work, is over five hundred miles inland, but it is remarkable in the northern portions of the continent, where they are more numerous, they are more common in the coastal districts and contiguous islands, occurring also throughout many islands of Torres Strait, almost, if not quite, to the coast of New Guinea. I give the following brief extracts from scientific journals relative to some of them.

The Hon. John Douglas, C.M.G., in an addenda to his article on "The Islands of Torres Straits" states²:—"He omitted to mention in his paper that there were some interesting remains of great fishing weirs on Darnley Island—great walls which had been built for catching fish. The present natives could not tell anything about them. They had been built by some previous generation, of which the records were lost now."

Major A. J. Boyd, who wrote the "Narrative of Captain G. Pennefather's Exploration" in H.M.Q.S. *Pearl* in the Gulf of Carpentaria in 1880, from Captain Pennefather's notes, remarks³:—"In the afternoon they landed on Point Parker. The landing is not a particularly good one, as it is fringed by rocks and stones for a quarter of a mile from the beach. . . .

² Douglas—Proc. Geogr. Soc. of Austr., Queensld. Branch, i., 1886, p. 83.

³ Boyd—Proc. Roy. Geogr. Soc. Austr., Queensld. Branch, xi., 1896, pp. 56-7.

"One of the first things that struck them on landing was the magnitude of the native fish-traps. These are precisely of the same description as those of the natives of the islands of Torres Straits. They formed, in reality, a succession of walled-in paddocks of many acres in extent. At high tide the fish come in, and as the tide recedes they are left high and dry."

Dr. Walter E. Roth, late Northern Protector of Aborigines, Queensland, thus refers to these stone fish-traps:—"On Sweers, Bentinck, Mornington, etc. Islands, [Gulf of Carpentaria] stone dams are erected along the coast-line in the shape of more or less of a half circle, the extreme of the convexity reaching sometimes to as much as 300 yards from the shore. The majority of these dams are contiguous, and built of pieces of stone (subsequently locked together by oyster-growths) to a height of from 18 inches to upwards of 3 feet, the general contour of the rocky beach being everywhere taken advantage of; they are covered at high water. The fish are thus blocked from going out to sea with each receding tide."

Mr. E. J. Banfield, in a paper on "Blacks as Fishermen," read before the Royal Society of Queensland, on the 24th June, 1909, remarks:—"Many years have elapsed—peradventure centuries—since the blacks of Missionary Bay, Hinchinbrook Island, built a weir of blocks and boulders of granite which oysters cemented here and there. On the fullness of spring tides fish frolicked over among the boulders. Those which delayed their exit found themselves in an enclosed pool which at certain seasons of the year runs dry. To this day the sea continues to pay tribute! though the blacks of the locality have passed away, and there is none but the red-backed sea eagle or the heavy flighted osprey and a rare and casual white man to receive it. Among the few emblems of the vanishing race, this persistent weir taking toll of the fish month after month, year after year, for the benefit of successive generations of eagles and ospreys, appeals vividly to the imagination."⁵

⁴ Roth—North Queensld. Ethn., Bull. No. 3, 1901, p. 23.

⁵ Banfield—Queensld. Geogr. Journ., xxiv., 1909, p. 54.

On Plate xxviii., fig. 1, will be seen the reproduction of a photograph of a mirage on Cato Plains, taken at 3 p.m. on the afternoon of the 21st October, 1915. These mirages were frequently to be seen in this dead level locality, after crossing the bridge over the Barwon River, shown on the same plate, Fig. 2, about a mile away from the billabong bridge and town. All of these optical illusions assumed the same form, being that of a large inland lake or sea with the trees on the distant horizon, apparently standing in water, or the base of their stems obscured with a thick, white haze.

The following species of birds, were noted, and in many instances obtained, during the trip.

CORVUS AUSTRALIS

Australian Raven.

Corvus coronoides, Gould, Bds. Austr., fol., iv., pl. 18 (1848).

Corvus australis, Gould, Handbk. Bds. Austr., i., p. 475 (1865).

Corone australis, Sharpe, Cat. Bds. Brit. Mus., iii., p. 37 (1877);
North, Nests and Eggs Austr. Bds., 2nd. ed., i., pt. i., p. 5 (1901).

This species was more freely distributed in and around Coolabah, than in the Brewarrina district. Complaints were loud in the former locality of its chicken thieving propensities, most chickens in the neighbourhood being protected in wire enclosures. Although the lamb and disabled sheep attacking proclivities of this bird were freely admitted in Brewarrina, it was not looked upon with such general abhorrence as it usually is with pastoralists in New South Wales. While going, one day, to photograph the billabong bridge in the latter town, I saw a Raven, feasting on something on the ground, and so intent was it on its meal that it allowed me to approach close enough to see its white iris. Presently a Black-faced Wood-Swallow (*Artamus melanops*) flew at the Raven, snapping its mandibles viciously as it dashed backwards and forwards, half a dozen or more times. Thinking possibly the Raven had caught a young Wood-Swallow, I ventured nearer, when the former flew away, carrying its booty with it into an adjoining back yard, surrounded with a three-railed fence, and I left it there afterwards picking at a bone.

STRUTHIDFA CINEREA

Apostle-bird

Struthidea cinerea, Gould, Proc.-Zool. Soc., 1836, p. 143; *id.*, Bds. Austr., fol., iv., pl. 17 (1848); Sharpe, Cat. Bds. Brit. Mus., iii., p. 140 (1877); North, Nests and Eggs Austr. Bds., 2nd, ed., i., pt. 1, p. 18 (1901).

Common both at Coolabah and Brewarrina, frequenting chiefly open forest-lands and pine scrubs. Usually met with in small flocks, from five to twelve or more in number, feeding on the ground beneath some wide spreading tree. When disturbed these birds take refuge in the lower limbs and rapidly hop from branch to branch, until near the top, then fly off, uttering harsh cries of alarm. If shot at, and one of their number is killed, or even wounded, the whole flock could be obtained, for the remainder, rapidly elevating their tail feathers up and down, and uttering cries of distress, gradually descend and come nearer and nearer, peering down in an inquisitive manner, until they are only a few yards above the head of the intruder. This species, which is often called in the inland portions of New South Wales the "Twelve Apostles" from their habit of associating in flocks, is one of the three species in Australia which constructs an open bowl-shaped nest of mud on the limb of a tree. Like the Chough (*Corcorax melanorhamphus*), in arid localities advantage is often taken to obtain the mud for nest building, after a passing thunderstorm, and of recent years from the margins of the sheets of water, the after result of artesian boring.

CORCORAX MELANORHAMPHUS

White-winged Chough.

Coracias melanorhamphus, Vieill. Nouv. Dict. d'Hist. Nat., viii., p. 2.

Corcorax leucopterus, Gould, Bds. Austr., fol., iv., pl. 16 (1848).

Corcorax melanorhamphus, Gould, Handbk. Bds. Austr., i., p. 470 (1865); Sharpe, Cat. Bds. Brit. Mus., iii., p. 149 (1877); North, Nests and Eggs Austr. Bds., 2nd. ed., i., pt. i., p. 21 (1901).

Seen both at Coolabah and Brewarrina. Flocks of these birds uttering their somewhat mournful notes, were observed in the neighbourhood of the railway station in the former locality, and on the banks of the Barwon River, near Brewarrina. Their actions in the trees resemble those of the Apostle-bird (*Struthidea cinerea*) hopping quickly from limb to limb, and at the same time rapidly elevating and depressing their outspread tail-feathers. During flight, the white bases of the quills are very conspicuous.

CHLAMYDODERA MACULATA.

Spotted Bower-bird.

Calodera maculata, Gould, Proc. Zool. Soc., 1836, p. 106.

Chlamydera maculata, Gould, Bds. Austr., fol., iv., pl. 8 (1848).

Chlamydolera maculata, Gould, Handbk. Bds. Austr., i., p. 450 (1865); Sharpe, Cat. Bds. Brit. Mus., vi., p. 389 (1881); North, Nests and Eggs Austr. Bd., 2nd. ed., i., pt. ii., p. 41 (1902).

Rare, owing principally to the drought, and not met with at Brewarrina, although I was informed that it occurred in the neighbourhood, when the summer fruits were ripening. Only on one occasion was it seen at Coolabah. While conversing with Mr. Leslie Grady, the Postmaster, just outside the Post Office, on the 14th October, a Spotted Bower-bird flew past quite close to us towards the Stationmaster's garden, but was not seen again.

I was informed at the hotel at Coolabah that some of these birds used to frequent the introduced Pepper trees (*Schinus molle*), growing near the house, their presence usually being indicated by mimicking the notes of other species, but none were met with while I was there; the only species procured from these trees being the Spiny-cheeked Honey-eater (*Acanthogenys ruficularis*). When at Bundong, in company with Constable W. C. Wrightson, Mr. Victor B. Hall, Junr., informed us that the Spotted Bower-bird did considerable damage in the orchard, especially when the persimmons were ripening. On making known that specimens of these birds were required by the Australian Museum, Mr. Hall later—on

the 23rd November—forwarded a fine old adult bird to the Trustees, but, unfortunately, through the hot weather, when it was received, it was too far gone for preservation. Both at Coolabah and Brewarrina, I met with many persons who knew the Spotted Bower-bird, and were acquainted with its habits and bower building propensities, but with few who had seen its nest and eggs, although I have known of them being found in many parts of Western New South Wales.

GRALLINA PICATA.

Magpie-Lark.

Gracula picata, Lath., Ind. Orn., Suppl., p. xxix. (1801).

Grallina australis, Gould, Bds. Austr., fol., ii., pl. 54 (1848).

Grallina picata, Gould, Handbk. Bds. Austr., i., p. 188 (1865); Sharpe, Cat. Bds. Brit. Mus., iii., p. 272 (1877); North, Nests and Eggs Austr. Bds., 2nd. ed., i., pt. ii., p. 88 (1902).

This familiar and useful species was noted everywhere, in suitable situations, throughout the trip. It is generally distributed over the greater portion of the Australian Continent, and it also occurs in Tasmania, but it is there very rare. This bird is beneficial to all engaged in rural pursuits, feasting on the ground upon the grass eating larvæ of numerous injurious insects, as well as on a small land mollusc, one of the intermediate hosts of fluke. It also frequents newly ploughed lands, orchards, vineyards and plantations, ridding the soil of many insect pests, among the latter being the Sugar Cane eating larvæ of a beetle which does much damage in the cane fields.

COLLYRIOCINCLA HARMONICA.

Grey Shrike-Thrush.

Turdus harmonicus, Lath., Ind. Orn., Suppl., p. xli, (1801).

Colluricincla harmonica, Gould, Bds. Austr., fol., ii., pl. 74 (1848); *id.*, Handbk Bds. Austr., i., p. 220 (1865).

Collyriocincla harmonica, Sharpe, Cat. Bds., iii., p. 290 (1877); North, Nests and Eggs Austr. Bds., 2nd. ed., i., pt. ii., p. 92 (1902).

The rich and melodious notes of this species, were first heard, and a pair of birds afterwards seen, in a large *Eucalyptus* growing on a bank of the Barwon River, near Brewarrina. Not seen at Coolabah. This familiar species will freely enter the verandahs and out-houses of residences in the country and the suburbs. One of the foster-parents of the Pallid Cuckoo (*Circulus inornatus*).

GRAUCALUS MELANOPS.

Black-faced Cuckoo-Shrike.

Corvus melanops, Lath., Ind. Orn., Suppl., p. xxiv. (1801).

Gravcalus melanops, Gould, Bds. Austr., fol., ii., pl. 55 (1848);
id., Handbk. Bds. Austr., i., p. 192 (1865); Sharpe, Cat.
 Bds. Brit. Mus., iv., p. 130 (1881); North, Nests and
 Eggs Austr. Bds. 2nd, ed., i, pt. ii., p. 103 (1902).

Not common, although observed both at Coolabah and Brewarrina. Seen about the outer branches of the *Eucalypti* growing in the hotel grounds at the former place. This species has a curious habit, when settling after flight, of lifting the wings and refolding them again. Popularly known in many parts of Australia by the name of "Blue Jay."

SAULOPROCTA MELALEUCA.

Black and White Fantail.

Muscipeta melaleuca, Quoy et Gaim., Voy. de l'Astrol., Zool., i., p. 180 (1830).

Rhipidura motacilloides, Gould. Bds. Austr., fol., ii., pl. 86 (1848).

Sauloprocta motacilloides, Gould, Handbk. Bds. Austr., i., p. 244 (1865).

Rhipidura tricolor, Sharpe, Cat. Bds. Brit. Mus., iv., p. 339 (1879).

Sauloprocta melaleuca, North, Nests and Eggs Austr. Bds., 2nd. ed., i., pt. iii., p. 132 (1903).

A few pairs of the Black and White Fantail, or more popularly known "Willy-wagtail," were seen both at Coolabah and Brewarrina. They were generally observed feeding upon insects disturbed by cows and horses while grazing, and are

close attendants on civilization, frequenting gardens and orchards, and often nesting in fruit trees. They are of a tame and fearless disposition and their notes, which resemble the sound of the words "Sweet pretty creature," may frequently be heard at night, especially when it is moonlight.

MICRÆCA FASCINANS.

Brown Flycatcher.

Loxia fascianus, Lath., Ind. Orn., Suppl., p. xlvi. (1801).

Microeca macroptera, Gould, Bds. Austr., fol., ii., pl. 93 (1848).

Microeca fascianus, Gould, Handbk. Bds. Austr.; i., p. 258 (1865); Sharpe, Cat. Bds. Brit. Mus., iv., p. 123 (1879); North, Nests and Eggs Austr. Bds., 2nd. ed., i., pt. iii., p. 149 (1903).

Only one example of the well-known Brown Flycatcher or "Jacky Winter" was noted, my attention being directed to it by Mr. L. Bucknell, Stock Inspector, on the way from Brewarrina to Tarrion Creek. This is generally the first species to usher in, with cheerful notes, the dawn of day in the neighbourhood of Sydney.

PETRÆCA GOODENOVII.

Red-capped Robin.

Muscicapa goodenovii, Vig. and Horsf., Trans. Linn. Soc., xv., p. 245 (1826).

Petroica goodenovii, Gould, Bds. Austr., fol., iii., pl. 5 (1848); id., Handbk Bds. Austr., i., p. 280 (1865).

Petræca goodenovii, Sharpe, Cat. Bds. Brit. Mus., iv., p. 171 (1879); North, Nests and Eggs Austr. Bds., 2nd ed., i., pt. iii., p. 168 (1903).

The Red-capped Robin was common at Coolabah and was the first species obtained by me; several adults of both sexes and one immature male being procured in a Wilga scrub at the back of the hotel. I first mistook the notes of the latter for those of a species of *Maturus*, and followed it for some time before managing to secure it. This species was seldom seen at Brewarrina, and never near the town.

MELANODRYAS BICOLOR.

Hooded Robin.

Cucullia bicolor, Vig. and Horsf., Trans. Linn. Soc., xv., p. 233 (1826).

Petroica bicolor, Gould, Bds. Austr., fol., iii., pl. 7 (1848).

Melanodryas cucullata, Gould, Handbk. Bds. Austr., i., p. 283 (1865).

Petroica bicolor, Sharpe, Cat. Bds. Brit. Mus., iv., p. 173 (1879).

Melanodryas bicolor, North, Nests and Eggs Austr. Bds., 2nd. ed., i., pt. iii., p. 170 (1903).

An adult female was the only example seen, while on the way from Brewarrina to Tarrion Creek.

SMICRORNIS BREVIROSTRIS.

Short-billed Scrub-Tit.

Psilopus brevirostris, Gould, Proc. Zool. Soc., 1837, p. 147.

Smicrornis brevirostris, Gould, Bds. Austr. fol., ii., pl. 103 (1848); *id.*, Handbk. Bds. Austr., i., p. 273 (1865); Sharpe, Cat. Bds. Brit. Mus., iv., p. 209 (1879); North, Nests and Eggs Austr. Bds., 2nd. ed., i., pt. iii., p. 189 (1903).

Common at Coolabah, several examples being procured in the Wilga scrubs. Not observed at Brewarrina, the class of country and trees not being suitable to its habits, near the town. This is the smallest species of bird inhabiting New South Wales, its range extending to Queensland, Victoria and South and Western Australia.

ACANTHIZA ALBIVENTRIS.

Pale-vented Thorn-bill.

Acanthiza albiventris, North, Nests and Eggs Austr. Bds., 2nd. ed., i., pt. iv., p. 276 (1904).

On the 6th October, 1915, being the first morning I was shooting at Coolabah, one of these birds was procured close to the ground, among the leafy branches of a low spreading Wilga. On picking the bird up, for I was too far away to see what it was when firing, found it was *Acanthiza albiventris*, described by me in "Nests and Eggs of Birds found breeding in Australia and Tasmania" in 1904. Unfortunately, although the body feathers were perfect, most of the quills of both wings were more or less damaged by the dust shot, and expecting to get more birds of this species, did not keep it. This was the only example seen, although subsequently others were diligently searched for. I first obtained this species in a low brigalow scrub of West Narrabri, in November, 1896. I have never seen a specimen of the true *Acanthiza pyrrhopygia*, of Gould procured in New South Wales, the type of which was obtained by Gould in the Belts of the Murray, South Australia, and for which the present species was previously mistaken, but doubtless it may occur in the extreme south-western portion of the State.

GEORASILEUS CHRYSORRHŒUS.

Yellow-rumped Thorn-bill.

Saricola chrysorrhœa, Quoy et Gaim., Voy. de l'Astrol., Zool., i., p. 198, Atlas, pl. 10, fig. 2 (1830).

Acanthiza chrysorrhœa, Gould, Bds. Austr., fol., iii., pl. 63 (1848).

Georasilæus chrysorrhœus, Gould, Handbk. Bds. Austr., i., p. 374 (1865); North, Nests and Eggs Austr. Bds., i., pt. iii., p. 282 (1904).

Acanthiza chrysorrhœa, Sharpe, Cat. Bds. Brit. Mus., vii., p. 298 (1883).

This well-known species was more frequently met with at Coolabah than at Brewarrina. Known locally in many parts of New South Wales under the name of "Yellow-tail" from its bright yellow upper tail-coverts—which show conspicuously during flight—also "Tomtit" and "Double-dick," the latter from its habit of constructing a double nest; the lower one being dome-shape and the one built on top of it cup-shape. Generally it is formed in the thick leafy end of a low drooping branch.

APHELOCEPHALA LEUCOPSIS.

White-faced Squeaker.

Xerophila leucopsis, Gould, Proc. Zool. Soc., 1840, p. 175; *id.*, Bds. Austr., fol., iii., pl. 67 (1848); *id.*, Handbk. Bds. Austr., i., p. 382 (1865); Gadow, Cat. Bds. Brit. Mus., viii., p. 73 (1883).

Aphelocephala leucopsis, Oberh., Proc. Acad. Nat. Sci. Philad., 1899, p. 214; North, Nests and Eggs Austr. Bds., 2nd. ed. i., pt. iv., p. 291 (1904).

Common both at Coolabah and Brewarrina and usually met with in small flocks feeding upon the ground. When disturbed by too close an approach, it usually flies into a low dead tree or on a bare branch; frequently on to the top of a three railed fence, and after danger is past returning on to the ground again. It is a dull coloured little bird, unobtrusive in habits, one's attention frequently being attracted to it by its low squeaking notes, usually uttered during flight.

EPHTHIANURA ALBIFRONS.

White-fronted Nun.

Acanthina albifrons, Jard and Selby, Ill. Orn., ii., pl. 56.

Ephthianura albifrons, Gould, Bds. Austr., fol., iii., pl. 64 (1848); *id.*, Handbk. Bds. Austr., i., p. 377 (1865); Sharpe, Cat. Bds. Brit. Mus., viii., p. 666 (1883); North, Nests and Eggs Austr. Bds., 2nd. ed., i., pt. iv., p. 343 (1904).

Only one pair, seen at Coolabah, in a paddock near the railway station. At Brewarrina, I was informed that both *Ephthianura tricolor* and *E. aurifrons* occurred in some seasons, but neither were observed during my stay there.

POMATOSTOMUS TEMPORALIS.

Grey-crowned Chatterer.

Pomatostomus temporalis, Vig. and Horsf., Trans. Linn. Soc., xv., p. 330 (1826); Gould, Bds. Austr., fol., iv., pl. 20 (1848); Sharpe, Cat. Bds. Brit. Mus., vii., p. 418 (1883).

Pomatostomus temporalis, Gould, Handbk. Bds. Austr., i., p. 479 (1865); North, Nests and Eggs Austr. Bds., 2nd ed., i., pt. iv., p. 358 (1904).

Common at Coolabah, less frequently observed at Brewarrina. Usually met with in open forest lands and pine scrubs, in small flocks, from four to seven or more in number, feeding on the grassy sward beneath some wide spreading tree, where with puffed out body feathers and slightly spread wings, they run here and there, disputing among themselves the possession of some insect or other coveted morsel and keeping up at the same time an incessant chattering. From their gregarious and sociable habits these birds are known in many parts of Western New South Wales, by the local name of "Happy Family." When disturbed by too close an approach they fly on to the lower branches of a tree and quickly hop from limb to limb until reaching the top, they leave, sometimes in twos and threes, following in a line one after the other.

The food of this species consisting principally of insects, it is looked upon as a useful bird by agriculturists and orchardists. Mr. R. Etheridge, however, informs me that about Colo Vale, on the southern line, about seventy-three miles distant from Sydney, at the end of August, in some seasons, these birds pull up the freshly sprouting oats, also eat grain later on, when ready for storing, and feast upon fruit when ripe, principally plums and cherries. It must be exceptional I think, for it is the only occasion I have heard of this bird being a pest.

GYMNORHINA TIBICEN.

Black-backed Magpie.

Coracias tibicen, Lath., Ind. Orn., Suppl., p. xxvii. (1801).

Gymnorhina tibicen, Gould, Bds. Austr., fol., ii., pl. 46 (1848); *id.*, Handbk. Bds. Austr., i., p. 175 (1865); Gadow, Cat. Bds. Brit. Mus., viii., p. 91 (1883); North, Nests and Eggs Austr. Bds., 2nd. ed., ii., pt. i., p. 1 (1906).

A few pairs observed immediately around the township of Coolabah, one pair having a nest with young, during my stay, near the Public School, the birds of which frequently swooped down on the children on their way to or from their lessons, as is their wont when one is near the vicinity of their nest. Less frequently met with at Brewarrina.

CRATICUS DESTRUCTOR.

Butcher-bird.

Tangia destructor, Temm. Man. d'Orn., pt. i., p. lix.

Craticus destructor, Gould, Bds. Austr., fol., ii., pl. 52 (1848);
Gadow, Cat. Bds. Brit. Mus., viii., p. 100 (1883); North,
Nests and Eggs Austr. Bds., 2nd. ed., ii., pt. i., p. 9
(1906).

Craticus torquatus. Gould, Handbk. Bds. Austr., i., p. 184
(1865).

Isolated pairs were noted at Coolabah, at some half to three quarters of a mile apart. As usual they were remarkably wary, keeping chiefly to the higher *Encalypti*, and their melodious notes were more often heard—especially in the early morning—than the birds were seen. They were less frequently observed at Brewarrina. The Butcher-bird will often destroy, or attempt to withdraw Canaries from their cages.

CRATICUS NIGRIGULARIS.

Black-throated Butcher-bird.

Tangia nigrigularis, Gould, Proc. Zool. Soc., 1836, p. 143.

Craticus nigrigularis, Gould, Bds. Austr., fol., ii., pl. 491
(1848); *id.* Handbk. Bds. Austr., i., p. 180 (1865).

Craticus nigrigularis, Gadow, Cat. Bds. Brit. Mus., viii., p. 95
(1883); North, Nests and Eggs Austr. Bds., 2nd. ed., ii.,
pt. i., p. 14 (1906).

Only two pairs noted, one at Coolabah, the other while on the way from Brewarrina to Tarrion Creek. At the former place while sitting alone quietly in a garden, contrary to their usual custom, one of these birds came and perched on a fence within ten feet of me. The clear and prolonged musical notes of the male are among the richest and most beautiful of those of any of our Australian arboreal birds and can be heard a considerable distance away. Like the two preceding species, the Black-throated Butcher-bird, amongst other food eaten, preys much on the smaller birds.

CLIMACTERIS PICUMNUS.

Brown Tree-creeper.

Climacteris picumnus (Temm.), Vig. and Horsf., Trans. Linn. Soc., xv., p. 295 (1826); Temm., Pl. Col. 281, fig. i.; North, Nests and Eggs Austr. Bds., 2nd. ed., ii., pt. ii., p. 42 (1906).

Climacteris scandens, (nec Temm.), Gould, Bds. Austr., fol., iv., pl. 93 (1848); *id.*, Handbk. Bds. Austr., i., p. 598 (1865).

Climacteris leucophura, Gadow, Cat. Bds. Brit. Mus., viii., p. 336 (1883).

I procured a pair of these birds passing through Willeroon Station. They were the only birds of this genus observed, and were precisely similar in colour, but slightly smaller than examples obtained in the neighbourhood of Sydney. This Tree-creeper has a wide range over the State, being common in the coastal districts, near Sydney, and is found at Bourke, over five hundred miles inland.

PTILOTTIS PENICILLATA.

White-plumed Honey-eater.

Meliphaga penicillata, Gould, Proc. Zool. Soc., 1836, p. 143.

Ptilotis penicillatus, Gould, Bds. Austr., fol., iv., pl. 43 (1848).

Ptilotis penicillata, Gould, Handbk. Bds. Austr., i., p. 519 (1865); Gadow, Cat. Bds. Brit. Mus., ix., p. 244 (1884); North, Nests and Eggs Austr. Bds., 2nd. ed., ii., pt. ii., p. 131 (1907).

Fairly common both at Coolabah and Brewarrina, nesting in the *Eucalypti* in the hotel grounds at the former place, and in the trees along the banks of the Darling and Barwon Rivers in the latter locality. The well-known notes of this Honey-eater, made welcome music to my ears, and reminded me of my early collecting days around Melbourne, the "Greenie," as it was there, and is still called, being the most common species of the Family Meliphagidæ, and its eggs dear to the heart of the average nest-hunting boy.

PLECTORHYNCHA LANCEOLATA.

Lanceolate Honey-eater.

Plectorhyncha lanceolata, Gould, Proc. Zool. Soc., 1837, p. 153;
id., Bds. Austr., fol., iv., pl. 47 (1848); *id.*, Handbk.
 Bds. Austr., i, p. 52 (1865).

Plectorhynchus lanceolatus, Gadow, Cat. Bds. Brit. Mus., ix., p.
 208 (1884).

Only one pair seen at Coolabah, one of which was procured.

ACANTHOGENYS RUFIGULARIS.

Spiny-cheeked Honey-eater.

Acanthogenys rufogularis, Gould, Proc. Zool. Soc., 1837, p. 153;
id., Bds. Austr., fol., iv., pl. 53 (1848).

Acanthogenys rufigularis, Gould, Handbk. Bds. Austr., i., p.
 534 (1865); North, Nests and Eggs Austr. Bds., 2nd. ed.,
 ii., pt. ii., p. 157 (1907).

Acanthochæra rufigularis, Gadow, Cat. Bds. Brit. Mus., ix., p.
 265 (1884).

Observed feeding in the Pepper trees (*Schinus molle*) in the hotel grounds at Coolabah; one pair procured in a *Eucalyptus* about a quarter of a mile from the railway station. Very much more freely distributed at Brewarrina, particularly in the trees opposite the Chinamens' garden, close to the bridge, over the Barwon River. One's attention is usually attracted to these birds by their peculiar notes, and which somewhat resemble those of the Wattled Honey-eater, or "Gill-bird" (*Anthochaera carunculata*) common in the early winter months in the coastal districts near Sydney.

PHILEMON CITREOGULARIS.

Yellow-throated Friar-bird.

Tropidorhynchus citreogularis, Gould, Proc. Zool. Soc., 1836, p.
 143; *id.*, Bds. Austr., fol., iv., pl. 60 (1848); *id.*, Handbk.
 Bds. Austr., i., p. 549 (1865).

Philemon citreogularis, Gadow, Cat. Bds. Brit. Mus., ix., p. 277 (1884); North, Nests and Eggs Austr. Bds., 2nd. ed., ii., pt. ii., p. 173 (1907).

While sitting on the western bank of the Barwon River at Brewarrina under the drooping branches of a gum tree one hot day, a single example of this species was noted; it was the only one observed during my visit.

MELITHREPTUS BREVIROSTRIS.

Short-billed Honey-eater.

Melithreptus brevirostris, Vig. and Horsf., Trans. Linn. Soc., xv., p. 315 (1826); Gould, Handbk. Bds. Austr., i., p. 569 (1865); Gadow, Cat. Bds. Brit. Mus., ix., p. 207 (1884); North, Nests and Eggs Austr. Bds., 2nd. ed., ii., pt. ii., p. 190 (1907).

Small flocks of these birds were noted passing from tree to tree at Coolabah. Not observed at Brewarrina. The egg of the Pallid Cuckoo (*Uculus inornatus*) is frequently deposited in the nest of this species.

MYZANTHA FLAVIGULA.

Yellow-throated Miner.

Myzantha flavigula, Gould, Proc. Zool. Soc., 1839, p. 143; *id.*, Bds. Austr., fol., iv., pl. 79 (1848); *id.*, Handbk. Bds. Austr., i., p. 578 (1865); North, Nests and Eggs Austr., Bds., 2nd. ed., ii., pt. ii. p. 202 (1907).

Common both at Coolabah and Brewarrina. It was the first species seen by me in the former locality, and a pair were nesting in a gum tree in the hotel grounds. This Honey-eater is one of the foster-parents of the Pallid Cuckoo (*Uculus inornatus*).

PARDALOTUS ORNATUS.

Striated Diamond-bird.

Pardalotus ornatus, Temm., Pl. Col., iv., pl. 394, fig. 1 (1826); Sharpe, Cat. Bds. Brit. Mus., x., p. 55 (1885); North, Nests and Eggs Austr. Bds., 2nd. ed., ii., pt. ii., p. 217 (1907).

Pardalotus striatus, Gould, Bds. Austr., fol., iv., pl. 38 (1848);
id., Handbk. Bds. Austr., i., p. 161 (1865).

Seen both at Coolabah and Brewarrina; specimens obtained in the former locality, which were frequenting the tall *Eucalypti* in and around the hotel grounds. Comparatively rare.

HIRUNDO NEOXENA.

Welcome Swallow.

Hirundo neoxena, Gould, Proc. Zool. Soc., 1842, p. 131; *id.*,
Bds. Austr., fol., ii., pl. 13 (1848); Sharpe, Cat. Bds.
Brit. Mus., x., p. 144 (1885); North, Nests and Eggs
Austr. Bds., 2nd. ed., ii., pt. ii., p. 234 (1907).

This well-known and familiar species was common everywhere, as it generally is in many parts of Australia and Tasmania. Before the advent of white settlers in Australia, the Welcome Swallow constructed its cup-shaped nest of mud, lined with dried grasses and feathers on the top of the remaining portion of broken hollow limbs of trees, or in rock shelters on the banks of rivers, or on cliffs facing the sea. Now its nests may be found anywhere about houses, and in outbuildings, dog's kennels, in laid up ship's galleys, etc.

CHERAMŒCA LEUCOSTERNUM.

White-breasted Swallow.

Hirundo leucosternus, Gould, Proc. Zool. Soc., 1840, p. 172.
Attivora leucosternon, Gould, Bds. Austr., fol., ii., pl. 12 (1848).
Cheramœca leucosterna, Gould, Handbk. Bds. Austr., i., p.
115 (1865).
Cheramœca leucosternum, Sharpe, Cat. Bds. Brit. Mus., x., p.
171 (1885); North, Nests and Eggs Austr. Bds., 2nd.
ed., ii., pt. ii., p. 238 (1907).

Noted only three examples of the White-breasted Swallow on the wing at Coolabah in a paddock close behind the hotel. The strikingly contrasted general black and white plumage of this species, and its graceful evolutions performed during flight, renders it one of the most conspicuous of the smaller birds of Australia. Contrary to the usual rule, one of these Swallows approached so close, that I thought it was going to settle upon me.

PETROCHELIDON NIGRICANS.

Tree Swallow.

Hirundo nigricans, Vieill., Nouv. Dict. d'Hist., xiv., p. 523, (1817).

Collocalia arborea, Gould, Bds. Austr., fol., ii., pl. 14 (1848).

Hylochelidon nigricans, Gould, Handbk. Bds. Austr., i., p. 111 (1865).

Petrochelidon nigricans, Sharpe, Cat. Bds. Brit. Mus., x., p. 190 (1885); North, Nests and Eggs Austr. Bds., 2nd. ed., ii., pt. iii., p. 241 (1909).

The vernacular names of Rock Swallow, as its generic name implies, and House Swallow are equally applicable to this species as that of the generally recognised name of Tree Swallow. It was not met with at Coolabah, but it was the first bird seen by me at Brewarrina, and as I found out afterwards was the most common bird to be met with in the town, not excepting the acclimatised and ubiquitous House Sparrow (*Passer domesticus*). These birds I found were utilizing nearly all the crevices and crannies in the woodwork of houses for their nests, but all seen were under verandahs, either of shops or places of business, or under the verandah of the balcony of the Barwon Hotel where I was staying; one nest, with young, being above the French windows of my bedroom. Nearly all had these breeding places in the woodwork, fashioned to the birds' liking with dried grasses and leaves and outwardly with pellets of mud, the shape varying according to the space to be filled up. The birds entered, and left the nests freely, and it reminded me very much of a similar scene I witnessed about the house and stables of "Holmfirth," at the Reedbeds, near Adelaide, South Australia.

PETROCHELIDON ARIEL.

Fairy Martin.

Collocalia ariel, Gould, Proc. Zool., 1842, p. 132; *id.*, Bds. Austr., fol., ii., pl. 15 (1848).

Lagenoplastes ariel, Gould, Handbk. Bds. Austr., i., p. 113 (1865).

Petrochelidon ariel, Sharpe, Cat. Bds. Brit. Mus., x., p. 199 (1885); North, Nests and Eggs Austr. Bds., 2nd. ed., ii., pt. iii., p. 244 (1909).

This, the fourth species, completes all the members of the Family Hirundinidæ, inhabiting Australia. It was met with only at Brewarrina, but was not nearly so freely distributed in the town as the preceding species, but it greatly exceeded in numbers the Tree Swallows in the immediate vicinity. My attention was first attracted to it by seeing two pairs of birds each constructing nests over the two front windows of the School of Arts. Shortly after I saw about a dozen of their curious retort-shaped mud nests in course of construction on a large rock at "The Fisheries," in the Darling, and only a few yards from the bank, on the Brewarrina side of the river, and from where the birds were collecting mud for building the nests. By far the largest community, however, seen on the following day, were busily engaged at nest building, under the bridge, which crosses the Barwon River, about a mile out of town. The same afternoon, driving in company with Mr. L. Bucknell, to Tarrion Creek, I asked him to pull up at the bridge which crosses the creek, there being no water in it at the time, while an examination was made underneath this structure. As was anticipated, there was a number of nests of the Fairy Martin, in various stages of construction, some just commenced, the most about half to three-quarters built, while a few had the bottle neck-like entrance but recently completed, which one could easily discern by the dark colour of the yet undried mud pellets. In two instances I saw birds carrying dried grasses into the otherwise apparently finished nests. All the nests observed by me were new, but none I believe then contained eggs.

From the shape the Fairy Martin forms its nest, this species is known in many parts of Australia under the local name of "Bottle Swallow."

ARTAMUS LEUCOGASTER.

White-rumped Wood Swallow.

Ocypterus leucogaster, Valenc. Mém. Mus. d'Hist., vi., p. 21, pl. viii., fig. 2 (1820).

Artamus leucopygialis, Gould, Proc. Zool. Soc., 1842, p. 17; *id.*, Bds. Austr., fol., ii., pl. 33 (1848); *id.*, Handbk. Bds. Austr., i., p. 154 (1865).

Artamus leucogaster, Sharpe, Cat. Bds. Brit. Mus., xiii., p. 3 (1890); North, Nests and Eggs Austr. Bds, 2nd. ed., ii., pt. iii., p. 251 (1909).

Only observed at Coolabah, where it was fairly numerous, especially about the hotel and railway station. Examples were first procured that were resting on the tops of small stones a few inches above the ground, others were observed perched on the telegraph wires, and on the hotel, which is the first time I have seen, or known, any species of Wood Swallow to resort to a dwelling. I had frequent opportunities of observing this habit, while sitting on a side balcony near my bedroom, for it was to be seen every day. Generally the birds used to perch in twos and threes, on the edge of the spouting, or on the top of a plaster finial at each side of the hotel. From these places, they would take a short flight in the air, and usually return to, or near, the same spot. On the 6th October, the first day after my arrival in Coolabah, on returning to the hotel in the evening, a little before 6 p.m. I saw about twenty of these birds huddled up closely together on the outer edge of the dining room chimney. Why they should have selected this resting place, was a mystery, to me, for although cool, there was no fire in the dining-room grate, so it could not have been for warmth. On looking again about half an hour later, after tea was finished, they had all left.

ARTAMUS SUPERCILIOSUS.

White-eyebrowed Wood Swallow.

Ocypterus superciliosus, Gould, Proc. Zool. Soc., 1836, p. 142.

Artamus superciliosus, Gould, Bds. Austr., fol., ii., pl. 32 (1848); *id.*, Handbk. Bds. Austr., i., p. 152 (1865); Sharpe, Cat. Bds. Brit. Mus., xiii., p. 15 (1890); North, Nests and Eggs Austr. Bds. 2nd. ed., ii., pt. iii., p. 253 (1909).

Seen both at Coolabah and Brewarrina, only though passing over in large straggling flocks, flying south, usually fairly high, and uttering their well-known notes, but occasionally low enough to be plainly seen. In neither place did I observe this species alight.

ARTAMUS MELANOPS.

Black-faced Wood Swallow.

Artamus melanops, Gould, Proc. Zool. Soc., 1865, p. 198; *id.*, Handbk. Bds. Austr., i., p. 149 (1865); Sharpe, Cat. Bds. Brit. Mus., xiii, p. 17 (1890); North, Nests and Eggs Austr. Bds., 2nd. ed., ii., pt. iii., p. 259 (1909).

Observed only at Brewarrina, although fairly well distributed, being noted even in the town, it was nowhere common. That it had been breeding was evident by my seeing, amongst others, fully fledged young, being fed by their parents, in the Chinamens' garden, near the bridge over the Barwon River. It was also observed in the Chinamens' garden lower down the river, close to the town, and on the way to Tarrion Creek from Brewarrina.

TENIOPYGIA CASTANOTIS.

Chestnut-eared Finch.

Amadina castanotis, Gould, Proc. Zool. Soc., 1835, p. 105; *id.*, Bds. Austr., fol., iii., pl. 87 (1848).

Teniopygia castanotis, Gould, Handbk. Bds. Austr., i., p. 419 (1865); Sharpe, Cat. Bds. Brit. Mus., xiii, p. 311 (1890); North, Nests and Eggs Austr. Bds., 2nd. ed., ii., pt. iii., p. 275 (1909).

Only one small flock of from eight to ten birds, seen feeding on the ground in the railway station yard at Coolabah. This is usually the commonest species of Finch inhabiting Western New South Wales.

ANTHUS AUSTRALIS.

Australian Pipit.

Anthus australis, Vig. and Horsf., Trans. Linn. Soc., xv., p. 229 (1826); Gould, Bds. Austr., fol., iii., pl. 73 (1848); *id.*, Handbk. Bds. Austr., i., p. 392 (1865); Sharpe, Cat. Bds. Brit. Mus., x., p. 615 (1885); North, Nests and Eggs Austr. Bds., 2nd. ed., ii., pt. iii., p. 303 (1909).

A pair of Australian Pipits, or the more popularly known "Ground Lark" was observed while driving with Constable W. C. Wrightson through Willeroon Station to Bundong. Not seen elsewhere.

MIRAFRA HORSFIELDI.

Horsfield's Bush Lark.

Mirafra horsfieldii, Gould, Proc. Zool. Soc., 1847, p. i.; *id.*, Bds. Austr., fol., iv., pl. 77 (1848); *id.*, Handbk. Bds. Austr., i., p. 404 (1865) (part)

Mirafra horsfieldi, Sharpe, Cat. Bds. Brit. Mus., xiii., p. 604 (1890); North, Nests and Eggs Austr. Bds., 2nd. ed., ii., pt. iii., p. 305 (1909).

A single example of this species was seen hovering about ten feet up in the air, pouring forth all the time, as is its wont, its sweet and varied notes. This was in the private grounds of Hayes Bros.' Wool Scouting Works, on the Barwon River, about two miles out from Brewarrina.

MEROPS ORNATUS.

Bee-eater

Merops ornatus, Lath., Ind. Orn., Suppl. p. xxxv. (1801); Gould, Bds. Austr., fol., ii., pl. 16 (1848); *id.*, Handbk. Bds. Austr., i., p. 117 (1865); Sharpe, Cat. Bds. Brit. Mus., xvii., p. 74 (1892); North, Nests and Eggs Austr. Bds., 2nd. ed., ii., pt. iii. p. 349 (1909).

Common both at Coolabah and Brewarrina, which at the former place I was informed had only appeared the week before my arrival. This migratory species is usually seen in pairs, perched together, near the dead end of a lateral branch of a gum tree, about thirty feet up; and occasionally low down in a Wilga, but always near the extremity of an outer branch. Seen in the sunlight, its brilliant general golden-green plumage and orange-rufous quills render it a most gorgeous and conspicuous object during its somewhat erratic flight. If it were rare, instead of a very common bird at certain times of the year, much more would be thought of the Bee-eater.

HALCYON PYRRHOPYGIUS.

Red-backed Kingfisher.

Halcyon pyrrhopygia, Gould, Proc. Zool. Soc., 1840, p. 113; *id.*, Bds. Austr., fol., ii., pl. 22 (1848).

Todirhamphus pyrrhopygius, Gould, Handbk. Bds. Austr., i., p. 130 (1865).

Halcyon pyrrhopygius, Sharpe, Cat. Bds. Brit. Mus., xvii., p. 258 (1892); North, Nests and Eggs Austr. Bds., ii., pt. iii., p. 369 (1909).

Only one seen at Coolabah, perched near the end of a dead branch of a tree, outside the railway station enclosure. More frequently met with at Brewarrina, especially in the large gum trees overhanging the Barwon River, near the bridge.

LAMPROCOCYX BASALIS.

Rufous-tailed Bronze Cuckoo.

Cuculus basalis, Horsf., Trans. Linn. Soc., xiii., p. 179 (1821).

Chrysocorys basalis, Gould, Bds. Austr., fol., iv., pl. 89 (pt.) (1848).

Lamprocorys basalis, Gould, Handbk., Bds. Austr., i., p. 626 (1865); North, Nests and Eggs Austr. Bds., 2nd. ed., iii., pt. i., p. 23 (1911).

Chalcocorys basalis, Shelley, Cat. Bds. Brit. Mus., xix., p. 294 (1891).

A single example procured while feeding on the ground at Coolabah, near the hotel, and which in the distance was mistaken for a female *Lalage tricolor*.

CAUATUA LEADBEATERI.

Leadbeater's Cockatoo.

Ptyctolophus leadbeateri, Vigors, Proc. Zool. Soc., 1831, p. 61.

Cauatua leadbeateri, Gould, Bds. Austr., fol., v., pl. 2 (1848); *id.*, Handbk. Bds. Austr., ii., p. 5 (1865); Salvad., Cat. Bds. Brit. Mus., xx., p. 123 (1891); North, Nests and Eggs Austr. Bds., 2nd. ed., iii., pt. ii., p. 81 (1911).

Saw only a bird trapper's call-bird in confinement at Coolabah, but was informed by the owner, as well as by other people, that this species was occasionally procured in the district, but was by no means common.

CACATUA ROSEICAPILLA.

Rose-breasted Cockatoo.

Cacatua roseicapilla, Vieill., Nouv. Dict. d'Hist., xvii., p. 12 (1817); Gould, Handbk. Bds. Austr., ii., p. 8 (1865); Salvad., Cat. Bds. Brit. Mus., xx., p. 132 (1891); North, Nests and Eggs Austr. Bds., 2nd. ed., iii., pt. ii., p. 88 (1911).

Cacatua eos, Gould, Bds. Austr., fol., v., pl. 4 (1848).

The Rose-breasted Cockatoo or "Galah" as it is more frequent called was occasionally seen singly, or in small flocks at Coolabah; several birds were observed perched on the telegraph wires opposite the hotel early one morning, but they were more common on Willeroon, the adjoining Station. Vast flocks, several hundreds in number, were observed feeding on the ground on Cato Plains, near Brewarrina, and in the vicinity of the Aboriginal Mission Station, on the Barwon River. Neither at Coolabah, nor Brewarrina, were any of these Cockatoos observed breeding. This species commits great havoc in the grain-crops. When taken from the nesting place, while young, it makes a remarkably interesting pet and a fine talker.

CALOPSITTACUS NOVÆ-HOLLANDIÆ

Cockatoo-Parrakeet.

Psittacus novæ-hollandiæ, Gmel., Syst. Nat., i., p. 328 (1788).

Nymphicus novæ-hollandiæ, Gould, Bds. Austr., fol., v., pl. 45 (1848).

Calopsitta novæ-hollandiæ, Gould, Handbk. Bds. Austr., ii., p. 84 (1865).

Calopsittacus novæ-hollandiæ, Salvad., Cat. Bds. Brit. Mus., xx., p. 135 (1891); North, Nests and Eggs Austr. Bds., 2nd. ed., iii., pt. ii., p. 95 (1911).

Rare. One specimen only obtained on Willeroon Station, adjoining Coolabah. This species is locally known in many parts of Western New South Wales as the "Quarrion."

POLYTELIS BARRABANDI

Barraband's Parrakeet.

Psittacus barrabundii, Swains., Zool. Illustr., pl. 59 (1821).

Polytelis barrabundi, Gould, Bds. Austr., fol., v., pl. 15 (1848); *id.*, Handbk. Bds. Austr., ii., p. 31 (1865); Salvad., Cat. Bds. Brit. Mus., xx., p. 478 (1891); North, Nests and Eggs Austr. Bds., 2nd. ed., iii., pt. ii., p. 99 (1911).

At Coolabah I saw a fine old adult male of Barraband's Parrakeet, or "Green Leek" in Constable W. C. Wrightson's aviary, and was informed by him that this species is usually very common in the district during winter, but all leave again early in spring. In the winter of 1914, he estimated, while on his rounds, he had observed over seven hundred of these birds, but in the winter months of 1915, little more than half that number. He had at various times seen many Barraband's Parrakeets in cages on the Coolabah railway station, that had been trapped in the district and were awaiting their despatch by train to Sydney bird-dealers.

I was rather surprised to learn of Barraband's Parrakeet occurring so far north and in such numbers. The stronghold of this species in the State, being the Wagga District, where it breeds, some two hundred and eighty miles to the south-east of Coolabah. Barraband's Parrakeet, when taken young from the nesting place, soon learns to clearly articulate short sentences, and when fully adult is one of the most beautiful and attractive of cage pets.

PTISTES ERYTHROPTERUS.

Red-winged Parrakeet.

Psittacus erythropterus, Gmel., Syst. Nat., i., p. 343 (1788).

Aprosmictus erythropterus, Gould, Bds. Austr., fol., v., pl. 18 (1848).

Ptistes erythropterus, Gould, Handbk. Bds. Austr., ii., p. 37 (1865); Salvad., Cat. Bds. Brit. Mus., xx., p. 481 (1891); North, Nests and Eggs Austr. Bds., 2nd. ed., iii., pt. ii., p. 108 (1911).

Occurs also at Coolabah, but the only examples I saw were cage birds in confinement, one of them an adult female, was a call bird, used by a trapper. Known locally, as in other parts of Northern and North-western New South Wales, as the "Bellowing." A fully adult male with its strikingly contrasted plumage of light green and red makes an unusually attractive cage bird.

BARNARDIUS BARNARDI.

Barnard's Parrakeet.

Platycercus barnardi, Vig. and Horsf., Trans. Linn. Soc., xv., p. 283 (1826); Gould, Bds. Austr., fol., v., pl. 21 (1848); *id.*, Handbk. Bds. Austr., ii., p. 40 (1865).

Barnardius barnardi, Salvad., Cat. Bds. Brit. Mus., xx., p. 558 (1891); North, Nests and Eggs Austr. Bds., iii., pt. ii., p. 133 (1911).

Barnard's Parrakeet, or "Bulu Bulu," as it is locally known in Central and Western New South Wales, was met with usually in small flocks of from four to seven in number at Coolabah, sometimes in pairs, but it was nowhere so common as I found it in 1905 on the Castlereagh River, some sixteen miles to the north of Coonamble. Probably the drought had something to do with the scarcity of this species, for I was informed that as a rule, it was plentiful in the neighbourhood. Not seen at Brewarrina.

PSEPHOTUS HÆMATONOTUS.

Red-rumped Parrakeet.

Platycercus hæmatonotus, Gould, Proc. Zool. Soc., 1837, p. 151.

Psephotus hæmatonotus, Gould, Bds. Austr., fol. v., pl. 36 (1848); *id.*, Handbk. Bds. Austr., ii., p. 69 (1865); Salvad., Cat. Bds. Brit. Mus., xx., p. 567 (1891); North, Nests and Eggs Austr. Bds., 2nd. ed. iii., pt. ii., p. 149 (1911).

Only odd pairs seen at Coolabah, and comparatively rare. It is the most common species of the genus *Psephotus*, inhabiting New South Wales. At Brewarrina it was more freely distributed, especially in the large *Eucalypti*, growing on the sides, or in the vicinity of the Barwon River near the bridge, about a mile out of town. One's attention is usually attracted to this species by the brilliant red colouring of the rump of the adult male, but on this occasion it was the low twittering notes of the female's consort, resembling those of the Warbling Grass-Parrakeet. I soon found that it proceeded from an adult male perched near a hole in a dead branch, and from which the female soon issued and flew a short distance away on to the ground in company with the male. Two other nesting-places were discovered by the same means in trees not far away. This was the only species of the Order Psittaci, I found breeding during the trip.

HALLIASTUR SPHENURUS.

Whistling Eagle.

Milvus sphenurus, Vieill., Nouv. Dict. d'Hist. Nat., xx., p. 564 (1818).

Haliastur sphenurus, Gould, Bds. Austr., fol., i., pl. 5 (1848); *id.*, Handbk. Bds. Austr., i., p. 20 (1865); Sharpe, Cat. Bds. Brit. Mus., i., p. 316 (1874); North, Nests and Eggs Austr. Bds., 2nd. ed. iii., pt. iii. p. 227 (1911).

The Whistling Eagle was the only bird of prey seen. It was noted on several occasions flying low down over the town of Brewarrina, and uttering at intervals, the peculiar notes, from whence it takes its vernacular name. I have never spent a similar period in any part of the State, and noted the Order Accipitres, any way near so poorly represented, and can only attribute it to the unusually dry season.

PHALACROCORAX CARBO.

Black Cormorant.

Pelecanus carbo, Linn., Syst. Nat., i., p. 216 (1766).

Phalacrocorax carboides, Gould, Bds. Austr., vii., pl. 66 (1848).

Phalacrocorax novæ-hollandiæ, Gould, Handbk. Bds. Austr., ii., p. 488 (1865).

Phalacrocorax carbo, Ogilvie-Grant, Cat. Bds. Brit. Mus., xxvi., p. 340 (1898); North, Nests and Eggs Austr. Bds., 2nd. ed. iii., pt. iv., p. 320 (1912).

Noted only at "The Fisheries" in the Darling River at Brewarrina. Occasionally seen perched on a low rock near the water, or on one of the stones forming the fish-traps or "yards," at intervals dropping off noiselessly into the water, and re-appearing again some distance away; perching again afterwards, and repeating the operation. One or two were generally to be seen at this part of the river, but I never observed them catch any fair-sized fish.

PHALACROCORAX MELANOLEUCUS.

Little Black and White Cormorant.

Hydrocorax melanoleucus, Vieill. Nouv. Dict. d'Hist. Nat., viii., p. 88 (1817).

Phalacrocorax melanoleucus, Gould, Bds. Austr., fol. vii., pl. 70 (1848); *id.*, Handbk. Bds. Austr., ii., p. 493 (1865); Ogilvie-Grant, Cat. Bds. Brit. Mus., xxvi., p. 398 (1898); North, Nests and Eggs Austr. Bds., 2nd. ed. iii., pt. v., p. 333 (1911).

Observed also only at "The Fisheries," in the Darling River, at Brewarrina, usually alone, never more than a pair, and similarly engaged in "fishing." When perched on a low rock near the water, the glistening white under surface shone like silver in the morning sun, as I usually visited this portion of the river shortly after day-break. At Chatswood, near Sydney, this species used to regularly visit a brick hole, in one of the busiest parts of the suburb, shortly after the introduction of a number of carp into the water.

IBIS MOLUCCA.

White Ibis.

Ibis molucca, Cuvier, Règne Anim., i., p. 520, note (1829); Sharpe, Cat. Bds. Brit. Mus., xxvi., p. 9 (1898); North, Nests and Eggs Austr. Bds., 2nd. ed. iv., pt. i. p. i. (1913).

Threskiornis strictipennis, Gould, Bds. Austr., fol. vi., pl. 46 (1848); *id.*, Handbk. Bds. Austr., ii., p. 284 (1865).

Sometimes one, or a pair of White Ibis were to be seen on the low grass-plots, or on the shallow water, at "The Fisheries," in the Darling River, at Brewarrina, and their general white plumage rendered them a conspicuous feature in the landscape. At times they were seen with about one-third of their bills thrust in the shallow water, feeling about for some stray morsel, or standing on one leg motionless, on the grassy sward of one of the small islets in the river. Of the few aquatic species noted at "The Fisheries," never more than one, or a pair, were seen at the same time, nor were they observed at any other part of the river.

NOTOPHOXY NOVÆ-HOLLANDIÆ.

White-fronted Heron.

Ardea novæ-hollandiæ, Lath., Ind. Orn., ii., p. 701 (1790); Gould, Bds. Austr., fol. vi., pl. 53 (1848); *id.*, Handbk. Bds. Austr., ii., p. 299 (1865).

Notophoxys novæ-hollandiæ, Sharpe, Cat. Bds. Brit. Mus., xxvi., p. 109 (1898): North, Nests and Eggs Austr. Bds., 2nd. ed. iv., pt. i., p. 23 (1913).

A single example of the White-fronted Heron was flushed, with its slow laboured flight, from some shallow water at the edge of the Barwon River, near Brewarrina. Known locally, as in most parts of Australia, as the "Blue Crane."

GEOPELIA TRANQUILLA.

Peaceful Dove.

Geopelia tranquilla, Gould, Proc. Zool. Soc., 1844, p. 56; *id.*, Bds. Austr., fol. v., pl. 73 (1848); *id.*, Handbk. Bds. Austr., ii., p. 144 (1865); Salvad., Cat. Bds. Brit. Mus., xxi., p. 456 (1893); North, Nests and Eggs Austr. Bds., 2nd. ed. iv., pt. ii. p. 117 (1913).

Common both at Coolabah and Brewarrina, frequenting chiefly the Wilga scrubs in the former locality, as well as the gardens in the townships, and the grounds of the hotel. It

was rare, indeed, that one or more of these little Doves was not to be seen about the yard or stables, feeding upon the ground. At Brewarrina, they came right up to the kitchen of the Barwon Hotel, which is situated in Bathurst-street, the busiest thoroughfare in the town. In addition to their well-known notes somewhat resembling the sounds of the words "Holly-Hock," or "Holly-Oak," they emit occasionally during the breeding season a far-away harsh grating note, like that of the Crane (*Grus australisiana*) or "Native Companion." Comparative with its size this species has one of the loudest notes of any of our Australian birds. During the last ten years the Peaceful Dove has largely increased in the neighbourhood of Sydney, especially in the suburbs of the Milson's Point Line. At the time of my leaving home for this trip, a pair were nesting in a large pine, in a garden directly opposite my house.

PHAPS CHALCOPHTERA.

Bronze-Wing.

Columba chalcoptera, Lath., Ind. Orn., ii., p. 604 (1796).

Peristera chalcoptera, Gould, Bds. Austr., fol., v., pl. 64 (1848).

Phaps chalcoptera, Gould, Handbk. Bds. Austr., ii., p. 122 (1865); Salvad., Cat. Bds. Brit. Mus., xxi., p. 526 (1893); North, Nests and Eggs Austr. Bds., iv., pt. ii. p. 127 (1913).

Fairly numerous, at times, at Coolabah I was informed, but at the time of my trip, I only saw examples in confinement, that had been trapped in the neighbourhood. One of these birds was caught by entering an open wired enclosure adjoining an aviary, containing a caged compatriot, among other birds. Usually found in Acacia scrub and dead thistle-beds. The Bronze-Wing generally comes to drink at some dam or water-hole about sundown, and frequently after it is quite dark. Many birds are consequently killed by flying against wire fences, the heads often being found on one side of the fence and the bodies on the other. Numbers of these birds too, are killed by poison laid for rabbits, or by drinking poisoned water, intended for rabbits, which is generally surrounded with wire-netting to prevent stock getting access to it. Tenanted nests of the Bronze-Wing, are more numerous in the spring and summer, but they may be found in any month of the year.

OCYPHAPS LOPHOTES.

Crested Bronze-Wing.

Columba lophotes, Temm., Pl. Col., 142 (1823).

Ocyphaps lophotes, Gould, Bds. Austr., fol., v., pl. 70 (1848); *id.*, Handbk. Bds. Austr., ii., p. 139 (1865); Salvad., Cat. Bds. Brit. Mus., xxi., p. 535 (1893); North, Nests and Eggs Aust. Bds., 2nd. ed. iv., pt. ii., p. 146 (1913).

It was remarkable that I was nearly a week in Coolabah before seeing one of these Pigeons, and yet they were freely distributed, only a few hundred yards away from the hotel. With one or two exceptions, all the birds seen by me were at a place known as the "gravel-pits," and all on the southern side of the railway line. Although a similar vegetation existed on the northern side, I never observed one of them there. As I have at other times noticed, these Pigeons come more into evidence about four o'clock in the afternoon, not moving about much during the heat of the day, but generally about this hour, they may be seen in twos and threes and small flocks flying about from tree to tree or feeding upon seeds of grasses, or those of herbaceous plants. Sometimes a dozen or more may be thus assembled, and when disturbed by too close an approach seek refuge in flight, usually in twos and threes. In a similar manner do they leave a tree when one approaches near them. Often have I thought all the Pigeons had left a tree before getting near it, yet many more were flushed from it at intervals, after standing beneath it. On this occasion while quietly engaged in threading up a specimen beneath the tree from where I had shot it, three more came and settled just above my head. One could almost recognise this species, by the rapid, and loud whirring noise made by the wings during flight and which has gained for it in the Moree district the aboriginal name of "Wirri-i-lah." Observed also at Brewarrina, but not so common.

LEIPOA OCELLATA.

Mallee-Fowl.

Leipoa ocellata, Gould, Proc. Zool. Soc., 1840, p. 826; *id.*, Bds. Austr., fol., v., pl. 78 (1848); *id.*, Handbk. Bds. Austr., ii., p. 155 (1865).

Lipou ocellata, Ogilvie-Grant, Cat. Bds. Brit. Mus., xxii., p. 463 (1893).

Constable W. C. Wrightson informed me that he only once met with this species at Coolabah—better known throughout South-eastern Australia as the Mallee-hen. This was in July, 1913, while riding slowly along about three miles out of Coolabah, at a place known as "The Swamp," when two of these birds quietly walked across the track, and were soon lost to view again in the bush on the opposite side of the road. This was the only occasion he met with them at Coolabah, during his eight years residence there, although they were well known to him, where he was formerly stationed, at Cobar. All persons I questioned relative to this species, were agreed that it was rapidly decreasing in numbers if it had not entirely disappeared from some parts of Western New South Wales. Mr. J. Armstrong, manager of Coronga Peak Station, twenty-eight miles north-west of Coolabah, informed me that the introduced foxes were rapidly getting rid of the Mallee-Fowls in that district, and one was now rarely seen, where formerly they were very numerous. On one occasion he took eight incubated *Leipou's* eggs from one of their hatching mounds on a distant part of the run, and placed them in a mound constructed by himself inside a small wired in enclosure in the near vicinity of the homestead. Out of this three young ones eventually made their way, two of which died, and the third one made its escape. He also told me that one of the station-hands was successful in rearing, from similarly constructed mounds, no less than twenty-eight young ones, but a Fox getting into the enclosure one night, killed all of them.

ÆDICNEMUS GRALLARIUS.

Southern Stone-Plover.

Charadrius grallarius, Lath., Ind. Orn., Suppl., ii., p. lxvi. (1801).

Ædicnemus grallarius, Gould, Bds. Austr., fol. v., pl. 5 (1848); *id.*, Handbk. Bds. Austr., ii. p. 210 (1865); North, Nests and Eggs Austr. Bds., 2nd. ed. iv., pt. iii., p. 246 (1913).

Burhinus grallarius, Sharpe, Cat. Bds. Brit. Mus., xxiv., p. 18 (1896).

Heard calling on several occasions at Coolabah in the early morning, probably from a large cultivated grass plot in a garden on the other side of the road running past the hotel. No examples seen.

ÆGIALITIS MELANOPS.

Black-fronted Dotterel.

Charadrius melanops, Vieill., Nouv. Dict. d'Hist., xxvii. p. 139 (1818).

Himantopus nigricollis, Gould, Bds. Austr., fol., vi., pl. 20 (1848).

Ægialitis nigricollis, Gould, Handbk. Bds. Austr., ii., p. 232 (1865).

Ægialitis melanops, Sharpe, Cat. Bds. Brit. Mus., xxiv., p. 300 (1896); North, Nests and Eggs Austr. Bds., 2nd. ed. iv., pt. iii., p. 279 (1913).

Pairs of Black-fronted Dotterel were noted about the margins or in the vicinity of the Barwon River, at Brewarrina. One pair by their actions about three hundred yards from the bridge which crosses this river near the Chinamens' garden, undoubtedly had eggs or young, but I was not looking for the former—in fact I did not take a single egg during the trip—the young stages too of this species were well known to me from examples captured near Sydney.

HYDROCHELIDON HYBRIDA.

Marsh Tern.

Sterna hybrida, Pallas, Zoogr., Rosso-Asiat., ii., p. 338 (1811).

Hydrochelidon fluvialis, Gould, Bds. Austr., fol., vii., pl. 31 (1848).

Hydrochelidon hybrida, Saunders, Cat. Bds. Brit. Mus., xxv., p. 10 (1896); North, Nests and Eggs Austr. Bds., 2nd. ed. iv., pt. iv., p. 301 (1914).

Two of these fairy-like denizens of the air, presumably a pair, flitted almost incessantly up and down "The Fisheries," in the Darling River, at Brewarrina, but were not observed at any other part of the river. The white and delicate shades of grey plumage, of the Marsh Terns, with an irregular background of dark green foliage, rendered them very conspicuous objects while on the wing. I never saw them attempt to descend, and capture anything from the water, as they usually do whether over a river, swamp, or grass-lands.

DROMÆUS NOVE-HOLLANDIÆ.

Emu.

Casuarius nove-hollandiæ, Lath., Ind. Orn., ii., p. 665 (1789).

Dromæus nove-hollandiæ, Gould, Bds. Austr., fol., vi., pl. 1 (1848); *id.*, Handbk. Bds. Austr., ii., p. 200 (1865).

Dromæus nove-hollandiæ, Salvad., Cat. Bds. Brit. Mus., xxvii., p. 586 (1895); North, Nests and Eggs Austr. Bds. 2nd. ed. iv., pt. iv. p. 398 (1914).

While driving through Willeroon Station, three of these birds rose up from the ground, where they had been partially concealed by some low bushes, and walked slowly away. They were about seventy yards away from the vehicle, and as the day was extremely hot, the horse was going at an easy pace, and neither the horse nor birds apparently cared to break into a run. Not met with at Brewarrina.

Only six Emus seen in three weeks, in country these birds frequent, is a poor record. Both between Narrabri and Moree, and Gilgandra and Coonamble, a decade ago, large flocks of Emus could be seen any day from the passing train, running alongside of the railway fence, or rather in some places, where the fence ought to be.

The Emu was first figured in Phillip's "Voyage to Botany Bay," in 1789, as the New Holland Cassowary, and was characterised the following year by Latham in his "Index Ornithologicus," as *Casuarius nove-hollandiæ*, Captain Tench in his "Settlement at Port Jackson," in 1793, first making us acquainted with its nests, eggs, and young. But the Emu no longer roams through the scrub between Port Jackson and Botany Bay, as in Phillip's and Tench's time. Ever since the settlement of the State, it has gradually been driven farther back. Its numbers, too, are rapidly decreasing by both birds and eggs being destroyed, in a ruthless manner by men employed for these purposes, for does not the Emu eat grass, and disturb breeding ewes?—unpardonable offences in the eyes of the pastoralist—besides the young birds have other enemies to contend with in the shape of dingoes and the introduced fox.

In the future, to see the Emu in a state of nature, in any great numbers, one must go "out back," as is the ever recurring cry. "Out back" which meant, in the early days of settlement, and for several decades after, subsequent upon the first crossing of the Blue Mountains barrier by Blaxland, Lawson, and Wentworth, in 1813, the fertile plains below "Out back" still later when it signified the Great Western Plains west of the Macquarie River, and for ever will be heard this cry, as the country becomes more thickly populated, and as the large pastoral areas are resumed for closer settlement, and for the growing of grain. At the present time there are unquestionably thousands of Emus in Western New South Wales, but inevitably in the future must this noble bird be driven further back, until the present terminus of the western railway system is reached, at Bourke, on the Darling River, five hundred and eight miles west of Sydney. "Out back" will then still be heard, as one journeys towards and across the South Australian border, where from Bourke the mode of travelling is replaced by motor car and camel "train," and still further "out back," to where obtains the smoke-signal language of the Central Australian Aborigines. When in the comparatively not far distant future, this unhappy time arrives, for the largest and finest bird in Australia, the Emu will be no more. What chance has a flightless bird of perpetuating its kind, with so many enemies to contend with, and how long will it be before someone records the passing away of the last Emu in Australia, as has been recently done with an at one time infinitely more numerous species, the Passenger Pigeon (*Ectopistes migratorius*), of North America? "Wilson, writing about 1808, estimated that a flock of Wild Pigeons (Passenger Pigeons) observed by him near Frankfort, Kentucky, contained at least 2,230,272,000 individuals" Yet the last surviving example, a female, which had lived in the aviary of the Cincinnati Zoological Gardens, United States, for twenty-nine years, died on the 1st September, 1914,⁶ the species became extinct.

⁶ The Ibis, 1915, p. 183.

EXPLANATION OF PLATE XXIV

The Fisheries in the Darling River, at Brewarrina
(northerly view), in the Western Land Board Division of
New South Wales



EXPLANATION OF PLATE XXV

“The Fisheries” in the Darling River at Brewarrina (this view follows on from the left hand of Plate xxiv)



EXPLANATION OF PLATE XXXI

"The Fisheries" in the Darling River at Brewarrina (another view of Plate xxv, with the aged aboriginal, "Steve Shaw," in one of the stone traps holding up a fish)



EXPLANATION OF PLATE XXVII

Survey plan of "The Fisheries" in the Darling River at
Brewarrina, by Mr Arthur W Mullen

EXPLANATION OF PLATE XXVIII

- Fig 1 A mnage on Cato Plains near Brewarrina
,, 2 Bridge over the Barwon River near Brewarrina



FIG. 1



FIG. 2

STUDIES IN AUSTRALIAN FISHES.

No. 4. *

By ALLAN R. McCULLOCH, Zoologist.

(Plates xxix-xxxi., figs. 1-2.)

Family CLUPEIDÆ.

Genus HYPERLOPHUS, *Ogilby*.

Hyperlophus, *Ogilby*, Rec. Austr. Mus., ii., 1892, p. 26. *Id.*,
Ogilby, Proc. Linn. Soc. N. S. Wales, xxi., 1897, p. 505,
and xxii., 1897, p. 71 (*H. sprattellides*, *Ogilby*).

Hyperlophus, subgenus *Omochetus*, *Ogilby*, Proc. Linn. Soc.
N.S. Wales, xxii., 1897, p. 72 (*H. copii*, *Ogilby*).

This genus has been confused with *Diplomystus*, Cope, a genus of fossil Herrings from the United States of America. The typical forms of Cope's genus, however, have the dorsal scutes pectinate posteriorly, and very different from those of the recent species.

HYPERLOPHUS VITTATUS, *Castelnau*.

(Plate xxix., figs. 1, 2.)

Meletta norw-hollandie, *Castelnau*, Proc. Zool. Soc. Vict., i.,
1872, p. 189 (Not *M. norw-hollandie*, Cuv. & Val.).

Meletta vittata, *Castelnau*, Res. Fish. Austr. (Vict. Offic. Rec.
Philad. Exhib.), 1875. p. 46 — substitute name.

Clupea vittata (*Castelnau*), *Macleay*, Proc. Linn. Soc. N.S.
Wales, iv., 1879, p. 379, and vi., 1881, p. 259. *Id.*, *Lucas*,
Proc. Roy. Soc. Vict., (2), ii., 1890, p. 37.

Clupea (*Hyperlophus*) *sprattellides*, *Ogilby*, Rec. Austr. Mus.,
ii., 1892, p. 24.

Diplomystus sprattellides, *Ogilby*, Ed. Fish. N.S. Wales, 1893,
p. 185.

* For No. 3, see "Records," ix., 1913, p. 355.

Hyperlophus sprattellides, Ogilby, Proc. Linn. Soc. N.S.Wales, xxii., 1897, p. 71, and Mem. Qld. Mus., v., 1916, p. 98. *Id.*, Waite, Mem. N.S. Wales Nat. Club, 1904, p. 13. *Id.*, Stead, Ed. Fish. N.S.Wales, 1908, p. 27.

Hyperlophus (Omochetus) copii, Ogilby, Proc. Linn. Soc. N.S. Wales, xxii., 1897, p. 72, and Ann. Qld. Mus., No. 9, 1908, p. 5, and Proc. Roy. Soc. Qld., xxi., 1908, p. 24. *Id.*, Waite, Mem. N.S.Wales Nat. Club, 1904, p. 13.

Diplomystus vittatus, Zietz,¹ Trans. Roy. Soc. S. Austr., xxxii., 1908, p. 295,—*nom. nud.*

Synonymy.—The possible identity of *Melettia vittata*, Castelnau, and *Hyperlophus sprattellides*, Ogilby, was suggested by the latter author in 1893, but for reasons which are apparently invalid, he retained his own name in preference to the earlier one of Castelnau. As it seems probable that the two names refer to the same species, I have adopted the name *vittata*.²

Having compared the typical specimens of *H. sprattellides* and *H. copii*, together with numerous other specimens in the Australian Museum collection, I regard the two forms as mere variations of the one species. The typical example of *H. sprattellides* (Fig. 2) is much deeper than any other I have seen, but its depth is exaggerated as a result of lateral compression which, in these fishes, follows upon preservation in alcohol. The type of *H. copii* (Fig. 1) on the other hand, is much more slender; it was fixed in formaline, and has retained its natural form better. My series shows the depth to be somewhat variable, as is also the exact position of the ventral fins in relation to the snout and the base of the caudal fin. As all the other characters appear to be identical in the two forms, there seems no reason to retain them as distinct species, and certainly not as distinct subgenera. The identity of the two forms has been recently recognised by Ogilby.

¹ A specimen received for examination from Mr. Edgar R. Waite, Director of the South Australian Museum, is evidently the example on which this name is based. Though associated with a different M.S. name, the data on its label tallies with that published by Zietz, being as follows,—“Encounter Bay, March '86. Cast up on the beach.” The specimen does not differ from the type of *H. sprattellides*.

² Ogilby also regarded *M. vittata*, Castelnau, as possibly identical with the common Fresh-water Herring, *Potamalosa*, but it is readily distinguished from that fish by the relative positions of the dorsal and ventral fins.

Locs.—The Australian Museum collection includes many specimens from various localities around Sydney, and from Port Stephens and Eden, New South Wales. Two identified by Ogilby as *H. copii* are from Southport, Moreton Bay, Queensland. A number of small specimens, 41-56 mm. long, from Safety Bay, Fremantle, Western Australia, are also apparently this species; they are more slender than larger examples, the depth being 5.4 in the length to the base of the caudal fin, and 1.3 in that of the head, which is 4 in the length; the number of scales and fin-rays do not appear to differ from those of New South Wales specimens.

HYPERLOPHUS TRANSLUCIDUS, sp. nov.

(Plate xxix., fig. 3.)

D. 15-16; A. 19-22; P. 10-13; V. 7; C. 19. L. lat. ? Head 4.08 in the length to the base of the tail; depth slightly greater than the length of the head, 3.9 in the same. Eye slightly longer than the snout, 3.3 in the head. Third dorsal ray 1.6, third anal ray 2.5, pectoral 1.6, ventral 2.3 in the head.

Body strongly compressed, the ventral profile much more strongly arched than the dorsal. Scales very deciduous, wanting in the type. Dorsal and ventral serratures well developed; there are sixteen scutes between the occiput and the origin of the dorsal fin, seventeen between the isthmus and the ventrals, and nine more to the vent.

Eye with a narrow adipose lid posteriorly. Nostrils superolateral, close together; the posterior is in the middle of the length of the snout. Maxillary reaching back to below the anterior portion of the eye. Jaws and palate toothless; tongue with minute teeth on the median line. Cheeks, opercles, and nape with a well developed muciferous system, which also extends onto the body behind the scapular bone.

Dorsal fin originating at a point midway between the snout and the base of the caudal, and terminating above the anterior anal ray. Ventrals inserted wholly before the dorsal, and nearer the snout than the base of the caudal.

Colour.—The body is translucent in life, with a broad silvery band extending from behind the head to the tail. The back bears some scattered blackish dots which extend on to the dorsal and caudal fins; lips and chin also dotted. Occiput dark brown. A dark spot at the base of each anal ray.

Described and figured from a specimen 58 mm. long. It is one of six of about the same length, which appear to be very similar, though some are slightly narrower than the type. They are readily distinguished from *H. sprattellides* by the forward position of the anal fin, which commences beneath the termination of the dorsal.

Loc.—Sans Souci, Botany Bay, New South Wales. Taken in a prawn-net by Mr. J. H. Wright.

Genus POTAMALOSA, Ogilby.

POTAMALOSA NOVE-HOLLANDIÆ (*Cuvier and Valenciennes*), *Gunther*.

(Plate xxix; fig 4.)

? *Meletta nove-hollandiæ*, Cuvier and Valenciennes, *Hist. Nat. Poiss.*, xx., 1847, p. 376. *Id.*, Castelnau, *Res. Fish. Austr.* (Vict. Offic. Rec. Philad. Exhib.), 1875, p. 46.

Clupea nove-hollandiæ, Gunther, *Brit. Mus. Cat. Fish.*, vii., 1868, p. 431. *Id.*, Macleay, *Proc. Linn. Soc. N.S.Wales*, iv., 1879, p. 379, and vi, 1881, p. 259. *Id.* Ogilby, *Cat. Fish. N.S.Wales*, 1886, p. 56.

Clupea (Hyperlophus) nove-hollandiæ, Ogilby, *Rec. Austr. Mus.*, ii., 1892, p. 26.

Diplomystus nove-hollandiæ, Ogilby, *Ed. Fish. N.S.Wales*, 1893, p. 184, pl. xlvii (bad).

Potamulosu nove-hollandiæ, Ogilby, *Proc. Linn. Soc. N.S.Wales*, xxi., 1897, p. 505. *Id.*, Waite, *Mem. N.S.Wales Nat. Club*, 2, 1904, p. 13. *Id.*, Stead, *Ed. Fish. N.S.Wales*, 1908, p. 26. *Id.*, Cockerell, *Mem. Qld. Mus.*, iii., 1915, p. 37.

Potamalosus antiqua, Ogilby, *Proc. Linn. Soc. N.S.Wales*, xxii., 1897, p. 70.

Clupea richmondia, Macleay, Proc. Linn. Soc. N.S.Wales, iv., 1879, p. 380; and vi., 1881, p. 259. *Id.*, Ogilby, Cat. Fish. N.S.Wales, 1886, p. 56.

The original notice of *Meletta novæ-hollandiæ* is very brief, and the details given differ somewhat from those of the common fresh-water Herring of New South Wales. It will therefore be necessary to examine the types in the Paris Museum before their identity can be established, but until this is done, we can conveniently follow Günther in accepting the name *novæ-hollandiæ* for our species.

This Herring is so far known only from the coastal rivers of New South Wales.³ It occurs in small schools in the Hastings River, and is most plentiful in the faster-running waters below the numerous "falls" or rapids. It rises readily to a small artificial fly. Specimens secured in this way during the latter part of March, 1916, and measuring about eight inches long, were found to contain well-developed milt and roe.

The specimen figured measures 177 mm. from the snout to end of the middle caudal rays, and was taken in fresh water in the Hastings River.

FAMILY PLESIOPIDÆ

GENUS TRACHINOPS, *Günther*.

TRACHINOPS CAUDIMACULATUS, *McCoy*.

Trachinops caudimaculatus, McCoy, Prodr. Zool. Vict., Dec. xx., 1890, pl. cxciv. *Id.*, Hall, Proc. Roy. Soc. Tasm., 1912, p. 83.

Trachinops tæniatus, Hall, Proc. Roy. Soc. Tasm., 1911, p. 32 (not *T. tæniatus*, *Günther*).

³ Kent included the names *C. novæ-hollandiæ* and *C. richmondia* in a list of Queensland fishes (Gt. Barrier Reef, 1893, p. 370), but further proof of the occurrence of this species in the northern State is required. Mr. J. Douglas Ogilby informs me that he has been unable to obtain any evidence of its existence there, and is of the opinion that it does not extend beyond the New South Wales border. Castelnau's record of *Meletta novæ-hollandiæ* from Victoria (Proc. Zool. Soc. Vict., i., 1872, p. 189) properly applies to *Hyperlophus vittatus*,—see p. 163

Pseudochromis rodwayi, Johnston, Abstract of Proceedings, Roy. Soc. Tasm., April, 1902, p. 6.

When in Hobart in 1914, I was enabled to examine the type of *Pseudochromis rodwayi* which is preserved in the Tasmanian Museum. It was in very bad condition, but a comparison of it with a well-preserved specimen of *T. caudimaculatus* left no doubt as to the identity of the two. The differences in the number of fin rays and spines as given by McCoy and Johnston are accounted for by the shrivelled condition of the latter author's specimen.

T. caudimaculatus has been recently recognised from Tasmania by Hall.

Family CHEILODIPTERIDÆ

Genus GLOSSAMIA, Gill.

Glossamia Gill. Proc. Acad. Nat. Sci. Philad., 1863, p. 82. (*Apogon aprion*, Richardson). [Not *Glossama*, Goode & Bean, Oceanic Ichthyology, 1895, p. 231.]

Mionorus, Krefft, Proc. Zool. Soc., 1867, p. 942 (*M. lunatus*, Krefft). [Not *Mionorus*, Jordan & Evermann, Bull. U.S. Fish. Comm., xxiii., 1905, p. 210, and Jordan & Seale, Bull. U.S. Fish. Bur., xxv., 1906, p. 247.]

Gulliveria, Castelnau, Proc. Linn. Soc. N.S.Wales, iii., 1878, p. 45 (*G. fusca*, Castelnau).

Glossamia was founded by Gill upon *Apogon aprion*, Richardson, which is a fresh-water species confined to Northern Australia. It was later used for a deep-water fish, *G. pundionis*, from the Atlantic by Goode and Bean, but that species is not congeneric with Gill's type.

Mionorus, Krefft, was also based on a fresh-water fish, *M. lunatus*, from New South Wales, but it has since been wrongly used to accommodate marine species of the same family by several American authors. I have compared Krefft's type, which is preserved in the Australian Museum, with the specimens here identified as *Glossamia aprion*, and find the differences between them to be of specific value only.

Gulliveria is evidently also identical with *Glossamia*.⁴ Castelnau's definition applies very well to *Gl. aprion*, when due allowance is made for the errors common to that author's writings. It may be noted also that Ogilby has recorded *Gl. aprion* from the Norman River, whence the types of *Gulliveria* were obtained.

The genus may be defined as follows :—

Fluviatile Cheilodipterids with a compressed and somewhat elevated body. Cranium with large cavities above covered by membrane. Mouth large; maxillary with a supplementary bone. Villiform teeth on the jaws, vomer, and palatines; a minute patch on the tongue. Preopercular borders smooth or with a few serrations below; operculum unarmed. Gill-rakers few, about six free, the anterior ones sessile. Body with moderate, ciliated scales; cheeks and opercles scaly. Lateral line complete. Dorsal spines and rays about vi. i/10; anal about ii/9.

Glossamia differs from *Amia* and its allies in the structure of the gill-rakers, and in having lingual teeth; the operculum also is unarmed.

GLOSSAMIA APRION, *Richardson*.

(Fig. 1.)

Apogon aprion, Richardson, Ann. Mag. Nat. Hist., ix., 1842, p. 16.

Apogonichthys aprion, Günther, Brit. Mus. Cat. Fish., i., 1859, p. 247. *Id.*, Macleay, Proc. Linn. Soc. N.S.Wales, v., 1881, p. 347.

Gulliveria fusca, Castelnau, Proc. Linn. Soc. N.S.Wales, iii., 1878, p. 45. *Id.*, Macleay, *Loc. cit.*, p. 349.

Gulliveria fasciata, Castelnau, *Loc. cit.*, p. 46. *Id.*, Macleay, *Loc. cit.*, p. 349.

Gulliveria ramsayi, Macleay, Proc. Linn. Soc. N.S.Wales, ix., 1884, p. 11.

⁴ I am indebted to Mr. J. D. Ogilby for directing my attention to the probable identity of *Gulliveria* and *Glossamia*.

Glossamia aprion, Ogilby, Mem. Qld. Mus., iii., 1915, p. 134.

D vi. i/10; A. ii/9-10; V. i/5; P. 12; C. 17; l. lat. 41-43; l. tr. $4\frac{1}{2}$ /1/13-14. Depth 2.4-2.6 in the length from the premaxillary symphysis to the hypural, and equal to the length of the head without the opercular lobe. Orbit a little longer than the snout, 3-3.6 in the head; interorbital space 1.5-1.9 in the eye. Second dorsal spine 2.2-2.6, and depth of caudal peduncle 2.3-2.5 in the head.

Body compressed, moderately elevated. Upper profile of head slightly concave, the snout obliquely truncate anteriorly; behind the occiput the body rises in a more or less pronounced curve to the dorsal fin, it being more arched in larger than in smaller specimens. Mouth oblique, maxillary extending to below the hinder orbital margin in adults, not so far in the young; lower jaw much longer than the upper. Preopercular margins smooth, the lowermost with a few obscure serrations; operculum unarmed, produced into a pointed lobe posteriorly. Suprascapular exposed, its edge smooth or crenulate. Teeth villiform, depressible, in broad bands on the jaws, a few near the symphyses slightly enlarged; a narrow angular band on the vomer, and a very narrow, elongate band on each palatine; a very small patch of minute teeth on the posterior part of the tongue. Lower limb of first gill-arch with six free gill-rakers, of which the longest is less than half as long as the eye.

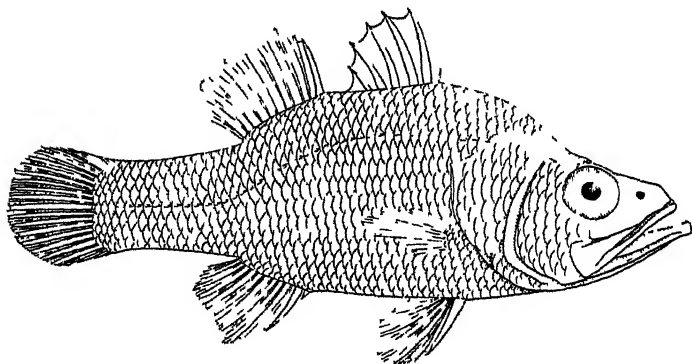


Fig. 1.—*Glossamia aprion*, Richardson.

Scales of the body with ciliated edges, those of the head cycloid; they extend forward to the occiput above, and cover the cheeks and opercles. Lateral line following the curve of the back from the suprascapular to the hypural, and consisting of a simple tube on each scale.

Relative positions of the fins slightly variable, due to changes of the form of the body with growth. First dorsal spine small, inserted a little behind the vertical of the base of the pectorals; second spine long and strong. Second dorsal fin with a strong spine. Ventrals inserted in advance of the pectorals, each with a strong spine. Anal with two spines, the first very small; its origin and termination are behind the same points of the second dorsal.

Colour.—After long preservation, uniform, the membrane of the outer half of the first dorsal blackish; the membrane between the ventral rays is also dark.

Described from three specimens, 77-109 mm. long, from the snout to the hypural, the largest is figured. They do not differ from Richardson's description of *Apogon aprion*, and also agree with that of *Gulliveria ramsayi*, Macleay⁵; they also scarcely differ from Castelnau's diagnosis of *Gulliveria fusca*, so I regard these three as synonymous. *Gu. fasciata*, Castelnau, which was taken with *Gu. fusca*, only differs from that species in being rather more elongate, in having the preoperculum somewhat serrated, and in its colour marking; all these characters are variable in the allied *Gl. gillii*, however, so I have no hesitation in regarding *Gu. fasciata* as another synonym of *Gl. aprion*.

Loc.—Collect's Creek, fifty miles inland from Port Darwin, North Australia.

GLOSSAMIA GILLII, Steindachner.

(Pl. xxxi., fig. 4.)

Apogonichthys gillii, Steindachner, Sitzb. Akad. Wiss. Wien, lv. i., 1867, p. 11, pl. i., fig. 1. *Id.*, Macleay, Proc. Linn. Soc. N.S.Wales, v., 1881, p. 347, and viii., 1883, p. 200.

⁵ The type of *Gu. ramsayi* is apparently lost. I am unable to find it in either the Macleay Museum or the Australian Museum collections.

Apogon gillii, Günther, Ann. Mag. Nat. Hist. (4), xvii., 1876, p. 392.

Mionurus lunatus, Krefft, Proc. Zool. Soc., 1867, p. 942.

Mionurus gillii, Ogilby, Mem. Qld. Mus., ii, 1913, p. 92.

A good series of twelve specimens, 42-113 mm. long, is preserved in the Australian Museum from Eidsvold, Queensland. The variation in the fin-rays and scales of twelve specimens is as follows:—D. vi. i/9-10; A. ii/8-9; l. lat. 25-31. The proportions of two specimens 111 and 42 mm. long are respectively:—Depth 2.4-2.8 in the length from the premaxillary symphysis to the hypural; head, without the opercular lobe, 2.5-2.4 in the same; eye 4.1-3.1, snout 3.2-4.2 and interorbital space 4.2-4.6 in the head; second dorsal spine 2.7-2.2, and caudal fin 1.4-1.7 in the head. *Colour*.—Brown with numerous larger and smaller irregular spots and blotches of darker brown; a dark bar extends backward from the eye to the shoulder, and all the head is more or less spotted; an interrupted band below the anterior dorsal spines, and another between the soft dorsal and anal fins, while there are several irregular patches on the caudal peduncle; membrane of the outer half of the spinous dorsal very dark, that of the other fins greyish, the soft dorsal and anal with their bases lighter.

These specimens only differ from my description of *G. aprion* in having fewer scales on the lateral line. The figure represents an example from Eidsvold 111 mm. long.

A careful comparison of one of Krefft's specimens of *Mionurus lunatus* from the Cox River, with those described above does not reveal any important differences between them, and indicates that it is only a local variation of *G. gillii*.

Locs.—Eidsvold, Burnett River, Queensland; coll. Dr. T. Bancroft. Lillesmere Lagoons, Burdekin River, Queensland; coll. A. Morton. Cox River, New South Wales; co-type of *M. lunatus*, coll. E. K. Cox.

Family LUTIANIDÆ.

Genus APRION, Cuvier and Valenciennes.

APRION ROSEUS, Castelnau.

(Plate xxx.)

Aphareus roseus, Castelnau, Proc. Linn. Soc. N.S.Wales, iii., 1879, p. 373.

Aprion microlepis (Bleeker) Ogilby, Mem. Qld. Mus., v., 1916, p. 182.

D. x/11. A. iii/8. P. 16. V. i/5. C. 17. L. lat. 64-66; 1. tr. $7\frac{1}{2}$ /16. Depth before the ventrals 3.3 in the length to the base of the tail; head 3.2-3.4 in the same. Eye 4.6-4.7 in the head, 1.4-1.5 in the snout, and 1.3-1.4 in the interorbital space. Preorbital width 1.3-1.5 in the eye. Snout 3.02-3.2, interorbital space 3.3 in the head. Fourth dorsal spine 2.3, first dorsal ray 2.9, pectoral fin 1.06, and ventral fin 1.2-1.3 in the head.

Eye placed well below the profile of the head, the interorbital space very convex; its length is much less than that of the snout, and is only about one-third greater than its distance from the preorbital margin. Nostrils close together, nearer the eye than the end of the snout, the anterior with a free dermal lobe. Maxillary naked, reaching a little beyond the vertical of the anterior orbital margin. Cheek with seven rows of scales, operculum with about ten; three and a half rows on the temporal region. Naked surfaces of the upper portion of the head, snout, preopercular limb, and mandible covered with minute pits and muciferous canals. Preopercular margin finely serrated posteriorly, the serrae enlarged on the angle which is produced slightly backward. Some rather strong canines anteriorly in each jaw, which become smaller on the sides; behind these is a band of villiform teeth which extends onto the sides of the upper jaw, but is confined to the front in the lower. A broad triangular patch of villiform teeth on the vomer, and a narrow elongate patch on each palatine. Suprascapular serrated.

Scales finely ciliated, extending onto the bases of the caudal and pectoral fins. No enlarged axillary ventral scale. Lateral line a little arched anteriorly, thence straight to the base of the caudal; it is formed of simple tubules.

Dorsal fin originating behind the vertical of the ventrals: its spines are slender, the fourth the longest, the others decreasing evenly backward; anterior ray subequal in length to the last spine, the others becoming shorter backward to the penultimate one, the last being produced. Third anal spine longest, a little shorter than the first ray; soft anal similar to the dorsal. Pectoral falcate, the fifth ray longest, not quite reaching the vertical of the vent. Anterior ventral ray produced, not reaching quite so far back as the pectorals. Caudal deeply forked.

Colour.—Pearly pink above, silvery below; the basal part of each scale of the back and sides bluish, the margin golden. Upper part of head deep pink, preorbital and snout violet pink, the whole stencilled with small yellow and blue lines. Spinous dorsal hyaline blue basally with ill-defined yellow vermiculating lines on the membrane; upper half of the fin hyaline pink, changing to yellow towards the margin; the markings of the soft dorsal are similar, but the yellow vermiculations change into two rows of orange spots posteriorly. Caudal light pink, the outer rays darker. Pectoral pale yellow. Ventrals and anal white. Iris golden.

Described from two specimens 390-410 mm. long, measured from the snout to the end of the middle caudal rays. They are perhaps identical with *A. microlepis*, Bleeker,⁶ from which they differ principally in having the eye much smaller and the preorbital broader. These characters doubtless alter with age, and as my specimens are much larger than those described by Bleeker, they perhaps represent merely the adult form of his species.

Loc.—Both these specimens were secured by Inspector Smithers in the city fish markets, whence they were dispatched from Byron Bay, New South Wales.

⁶ Bleeker—Atlas Ichth., viii., 1876-77, p. 78, pl. cccxxvi., fig. 5.

Family SCORPIDIDÆ.

Genus SCORPIS, Cuvier and Valenciennes.

Scorpis, Cuvier and Valenciennes, Hist. Nat. Poiss., viii., 1831, p. 503 (*S. georgianus*, Cuv. and Val.). *Id.*, Günther, Brit. Mus. Cat. Fish., ii., 1860, p. 63. *Id.*, Vaillant, Bull. Mus. Hist. Nat., iii., 1897, p. 84.

Agenor, Castelnau, Proc. Linn. Soc. N. S. Wales, iii., 1879, p. 371 (*A. modestus*, Cast.). *Id.*, Vaillant, *Loc. cit.*, p. 86.

Neptotichthys, Hutton, Trans. N. Zeal. Inst., xxii., 1890, p. 278 (*N. violaceus*, Hutton).

Cesiosoma, Kaup, Nederl. Tijdschr. Dierk., i., 1864, p. 161 (no type; later called *C. sieboldi*, Blkr.).

Definition.—Body compressed, somewhat elevated or oblong-ovate. Preopercle serrated. Body and greater part of head covered with rather small, ctenoid scales. Jaws with bands of teeth, and an outer, more or less enlarged series; patches of minute teeth present on the vomer, palatines, pterygoids and tongue. One dorsal with nine or ten spines increasing in length backwards, and twenty-four to thirty rays. Anal with three spines and twenty-four to thirty rays. Soft portions of the vertical fins scaly, the spinous portion with a scaly sheath; seven branchiostegals. Pseudobranchiae present. Airbladder present. Pyloric appendages in large numbers.

Key to the Australian species:—

- a. Body deep, the depth more than half the length. Soft dorsal and anal fins strongly produced anteriorly.
 - b. Body with darker cross-bands..... *georgianus*.
- aa. Body narrower, the depth half or less than half the length. Soft dorsal and anal fins not or only slightly produced anteriorly. Body without darker cross-bands.
 - c. About as many rays in the dorsal as in the anal fin.
 - d. Scales smaller, more than 100 above the lateral line. Maxillary as broad as its distance from the eye..... *æquipinnus*.
 - dd. Scales larger, less than 100 above the lateral line. Maxillary broader than its distance from the eye.
 - e. Anal rays equal to or more numerous than those of the dorsal. Interorbital space less convex, eye larger..... *lineolatus*.
 - ee. Anal rays less numerous than those of the dorsal. Interorbital space very convex, eye smaller..... *violaceus*.
 - cc. Dorsal with thirty, anal with twenty-three rays..... *oblungus*,

Cresiosoma.—*S. aequipinnis* and *S. lineolatus* have been separated from *Scorpiis* under the name *Cresiosoma*, but they appear to me to be congeneric with *S. georgianus*; the only major difference between these species lies in the general form of the body, which is scarcely of generic value. According to Troschell⁷, the name *Cresiosoma* was proposed for a Japanese fish which had no specific name: Bleeker⁸ later called it *C. sieboldi*, which name should apparently stand as the type of the genus, and which he regarded as probably synonymous with *C. aequipinnis*. I am indebted to Professor D. S. Jordan for a copy of Bleeker's definition, and he notes that he knows of no fish of this type from Japan. It therefore appears that *Cresiosoma sieboldi* is not a Japanese fish but is synonymous with *Scorpiis aequipinnis*, and that *Cresiosoma* is not distinct from *Scorpiis*.

SCORPIIS GEORGIANUS, Cuvier and Valenciennes.

Scorpiis georgianus, Cuvier and Valenciennes, Hist. Nat. Poiss., viii., 1831, p. 503, pl. ccxlv. *Id.*, Richardson, Ichth. "Erebus and Terror," 1848, p. 121. *Id.*, Günther, Brit. Mus. Cat. Fish., ii., 1860, p. 64. *Id.*, Klunzinger, Sitzb. Akad. Wiss. Wien, Lxxx. i., 1879, p. 364. *Id.*, Macleay, Proc. Linn. Soc. N.S.Wales, v., 1881, p. 397. *Id.*, Johnston, Proc. Roy. Soc. Tasm., 1882 (1883), p. 111, and 1890 (1891), p. 30. *Id.*, Waite, Rec. Austr. Mus., vi., 1905, p. 64.

D. x./24-25. A. iii/25-26. P. 16-17. V. i./5. C. 17. Body elevated, the depth before the anal fin 1.6-1.8 in the length to the hypural joint; head 3.3-3.4 in the same. Eye 3.6-3.8 in the head. Second dorsal ray 0.07-1.2 longer than the head. Second anal ray about as long as the head. Profile markedly convex above the eye. Mandible long and narrow, reaching to below the middle of the pupil, and scarcely broader than its distance from the eye. Outer row of teeth much larger than the others. Scales rather small, about eighty-five series above the lateral line between its origin and the hypural joint; about twenty scales between the

⁷ Troschell - Arch. Naturg., 1863.

⁸ Bleeker - Arch. Néerl. Sc. Nat., xi., 1876, p. 299, and Verh. Akad. Amsterdam, xviii., 1879, p. 8.

base of the anterior dorsal rays and the lateral line, and about the same number between the base of the pectoral and the ventral spine. Dorsal and anal fins strongly produced anteriorly. Brown with two broad darker cross-bands, the first below the spinous dorsal and the second between the anterior portions of the soft dorsal and anal.

This definition is based upon two specimens 187 and 277 mm. long from the snout to the end of the middle caudal rays. One is from Albany, and the other from Fremantle, south-western Australia.

Distribution.—South-western Australia. Johnston doubtfully records the species from Tasmania.

SCORPIS EQUIPINNIS, Richardson.

(Fig. 2.)

Scorpis equipinnis, Richardson, Ichth. "Erebus and Terror," 1848, p. 121. *Id.*, Günther (part), Brit. Mus. Cat. Fish., ii., 1860, pp. 64, 518, and Ann. Mag. Nat. Hist. (3), xx, 1867, p. 58.

D. ix-x/25 (-27). A. iii/25-26. P. 18. V. 1/5. C. 17. Depth at the ventrals 2.1 in the length to the hypural joint; head 3.5 in the same. Eye 4, second dorsal ray and second anal ray 1.6 in the head. Upper and lower profiles subequal, that above the eye evenly convex. Mandible long and rather narrow, reaching to below the anterior border of the pupil, its width subequal to its distance from the eye. Outer row of teeth in each jaw considerably larger than the others. Scales small; more than one hundred series above the lateral line between its origin and the hypural joint; about eighteen between the base of the second dorsal ray and the lateral line, and more than 20 between the base of the pectoral and the ventral spine. Dorsal and anal fins produced anteriorly. Colouration uniform.

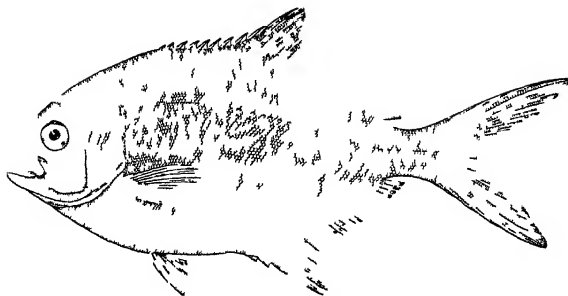


Fig 2—*Scorpius aequipinnus*, Richardson

This definition is based upon a large example, 323 mm long from the snout to the end of the middle caudal rays, from near Fremantle, Western Australia. A second slightly larger specimen is in the Australian Museum from Adelaide, South Australia.

Distribution—South and South-western Australia

SCORPIS LINEOLATUS, Kner

Scorpius lineolatus, Kner, Reise "Novara," Zool., 1., Fische, pt 1, 1865, p 108, pl v, fig 3

Scorpius aequipinnus, Günther, Brit Mus Cat Fish, ii, 1860, p 64 (part). *Id.*, Bleeker, Nederl Tijdschr Dierk., ii, 1865, p 70. *Id.*, Steindachner, Sitzb Akad Wiss Wien, lvi 1, 1866, p 436, and lvi 1, 1867, p 334. *Id.*, Castelnau, Proc Linn Soc N S Wales, iii, 1879, p 376. *Id.*, Macleay, Proc Linn Soc N S Wales, v, 1881, p 397. *Id.*, Ogilby, Cat Fish N S Wales, 1886, p 17, and Ed Fish N S Wales, 1893, p 38, pl x. *Id.*, Waite, Mem N S Wales Nat Club, 1904, p 35. *Id.*, Stead, Ed Fish N S Wales, 1908, p 79 (Not *S. aequipinnus*, Richardson).

Cresosoma aequipinnus, Waite, Mem Austr Mus, iv, 1899, p 84. *Id.*, Ogilby, Proc Roy Soc Qld, xxi, 1908, p 25

Scorpius notatus, Steindachner, Sitzb Akad Wiss Wien, III 1, 1866, p 437, pl v, fig 1

Ajencia molestus, Castelnau, Proc Linn Soc N S Wales, III, 1879, pp 350, 371 *Id*, Macleay, Proc Linn Soc N S Wales, v, 1881, p 368 *Id*, Ogilby, Cat Fish N S Wales, 1886, p 12 *Id*, Vaillant, Bull Mus Hist Nat, III, 1897, p 86

D $\pi/25-27$ A III 27-29 P 18 V $1/5$ C 17 Proportions of a specimen 257 mm long from the snout to the end of the middle caudal rays — depth at the ventrals 2.2 in the length to the hypural joint, head 3.7 in the same, eye 3.7, second dorsal ray 2.1, and second anal ray 1.9 in the head. Upper and lower profiles subequal, that above the eyes not evenly convex, but oblique on the snout, and convex on the nape. Mandible shorter and broader than in *Scorpius*, not reaching to below the pupil, its width much greater than its distance from the eye. Outer series of teeth not so strong as in *Scorpius*. Scales larger, in about ninety series above the lateral line between its origin and the hypural joint, about fifteen between the base of the anterior dorsal rays and the lateral line, and about thirteen between the base of the pectoral and the ventral spine. Dorsal and anal fins not produced anteriorly, the anal with more rays than the dorsal. Colouration uniform.

This definition is based on four adult specimens from New South Wales.

This species has been confused with *Scorpius* but may be readily distinguished by its much larger scales on the breast, and the broader maxillary. The profile of the snout is also different in the two species, and the dorsal and anal fins are differently formed.

Distribution —New South Wales and Southern Queensland

SCORPIUS VIOLACEUS, Hutton,

Ditrema violaceum, Hutton, Trans N Zeal Inst, v, 1873, p 261, pl VIII, fig 31b

Neptotichthys violaceus, Hutton, *Lor. cit.*, xxii., 1890, p. 278.
Id., Waite, Proc. Linn. Soc. N.S.Wales, xxii., 1898,
 p. 685.

Scorpis violaceus, Waite, Mem. N.S.Wales Nat. Club, 1904,
 p. 35.

D. x. 27-29. A. iii/25-27. P. 19. V. i./5. C. 17.
 Proportions of a specimen 221 mm. long from the snout to the end of the middle caudal rays: depth 2.3 in the length to the hypural, head 3.7 in the same; eye 3.6, second dorsal ray 1.8, and second anal ray 1.6 in the head. Upper and lower profiles subequal, that above the eye evenly convex. Mandible broad, reaching to or nearly to below the anterior margin of the pupil; its width much greater than its distance from the eye. Outer series of teeth not much larger than the others. Scales moderate, about 89 series above the lateral line between its origin and the hypural joint; about twelve between the base of the anterior dorsal rays and the lateral line, and about fifteen between the base of the pectoral and the ventral spine. Dorsal and anal fins not produced anteriorly, though the first three or four anal rays are a little longer than the succeeding ones. Colouration uniform.

This species is distinguished from *S. lineolatus* by the much more convex profile of the head, and in having fewer rays in the anal than in the dorsal. The much broader maxillary and the larger scales separate it from *S. equipinnis*.

Seven adult examples are in the Australian Museum from Norfolk and Lord Howe Islands. Waite has recognised the species from near Sydney, but the specimen on which his record was based cannot now be found.

Distribution.—New Zealand to Norfolk Island, Lord Howe Island, and New South Wales.

SCORPIS OBLONGUS, *Canestrini*.

Scorpis oblongus, Canestrini, Arch. per la Zool. Anat. Fisiol., (2), i., 1869, p. 153.

D. ix./30. A. iii./23. Height below the origin of the soft dorsal, three in the length without the caudal; head four in the same. Eye $3\frac{1}{4}$ in the head. Dorsal and anal fins not produced anteriorly.

This species has not been recognised since it was originally described. The number of rays in the dorsal and anal fins, as given by Canestrini, distinguishes it from any species of *Scorpiis* known to me. The type was said to have been obtained in Australia.

Family MONODACTYLIDÆ.

Genus SCHUETTEA, *Steindachner*.

SCHUETTEA SCALARIPINNIS, *Steindachner*.

Schuettea scalaripinnis, Steindachner, Sitzb. Akad. Wiss. Wien, liii., 1866, p. 449, pl. vi., fig. 1. *Id.*, Günther, Zool. Rec., 1866, p. 141. *Id.*, McCulloch, Zool. Res. "Endeavour", i., 1911, p. 81, pl. xv.

Scorpiis boops, Peters, Monatsb. Akad. Wiss. Berlin, 1866, p. 521. *Id.*, Günther, *Loc. cit.*

Scorpiis boops, Peters, has drifted into the synonymy of *S. æquipinnis*, Richardson, to which it bears no resemblance. It is identical with *Schuettea scalaripinnis*, Steindachner, as noted by Günther.

Steindachner's paper appeared almost simultaneously with that of Peters, but the actual date of publication is unknown to me. The former was "read" on 8th March, 1866, and the latter on 23rd July, 1866.

Family KYPHOSIDÆ.

Genus KYPHOSUS, Lacépède.

KYPHOSUS CINERASCENS, *Forskul.*

Pimelepterus cinerascens (Forsk.), Bleeker, Atlas Ichth., ix., 1877, p. 15, pl. cccxiv., fig. 4. *Id.*, Ogilby, Mem. Qld. Mus., ii., 1913, p. 90.

Scorpiis vinosa, Alleyne and Macleay, Proc. Linn. Soc. N.S.Wales, i., 1879, p. 277, pl. ix., fig. 2.

The type of *Scorpiis vinosa* is a young *Kyphosus*, and apparently identical with *K. cinerascens*. It has eleven instead of ten dorsal spines as described, and 12 rays, the anterior of which are much higher than the spines. Anal with three spines and eleven rays.

Macleay's specimen was collected at Daruley Island, Torres Strait, while *K. cinerascens* has recently been recorded from the same locality by Ogilby.

FAMILY POMACENTRIDÆ.

Genus GLYPHISODON, Lucipède.

GLYPHISODON NIGRIFRONS, Macleay.

Glyphisodon nigrifrons, Macleay, Proc. Linn. Soc. N.S.Wales, viii., 1883, p. 271.

The type of this species is preserved in the Australian Museum, with its original label, and is evidently authentic. It differs from Macleay's brief description in having thirteen instead of eleven anal rays, in having the interorbital space only slightly wider than the orbit instead of nearly twice as wide, and in showing three dark bands which are similar to those of *G. curacao*, Bloch.

A careful comparison of it with examples of *G. curacao* proves it to be similar to that species in all its characters except those relating to the anterior portion of the head. The type has the interorbital space somewhat wider, the snout shorter, and the preorbital bone broader than the others, suggesting that it is abnormal in these details. If this be admitted, it cannot be separated from *G. curacao*.

Loc.—South-eastern coast of New Guinea.

Family SCOMBRIDÆ.

Genus GYMNOSARDA, Gill.

GYMNOSARDA ALLETERATA, Rafinesque.

Little Tunny: Bonito

Gymnosarda alleterata (Rafinesque). Jordan & Evermann, Bull. U.S. Fish Comm., xliii. i., 1905, p. 173, fig. 65—synonymy.

Thynnus agnatus (Cantor), Macleay, Proc. Linn. Soc. N.S.Wales, v, 1881, p. 556

Two fine examples, 710 and 745 mm. long, were forwarded to the Australian Museum by Mr C. H. Gorrick. He secured them on a rod out of an enormous shoal, while trolling a gar-fish bait at the entrance to Port Stephens, New South Wales. The fish were so numerous that the movements of the shoal "lashed the surface of the water into foam."

This species was recorded from Port Jackson by Macleay in 1881, since which time it has not been recognised in Australian waters until rediscovered by Mr. Gorrick.

Family GOBIIDÆ.

The three Gobies here described and figured do not enter the typical genus *Gobius* in its restricted form. It is probable that new subdivisions will be found necessary to accommodate them, but as I am unable to refer to many of those already defined, it is better to leave them in abeyance until a revision of the Australian species can be undertaken.

(GOBIUS) EREMIUS, Zietz.

(Plate xxxi.; fig. 1.)

Gobius eremius, Zietz, Rept. Horn. Sci. Exped., ii., 1896, p. 180, pl. xvi., fig. 5.

Br. 5; D. vi, 9-10; A. 8-9; C. 15-16; P. 13; V. i, 5. Depth 4.7 in the length to the hypural joint; head 3.3 in the same. Diameter of the eye equal to the length of the snout, 4.3 in the head.

General form robust, depressed anteriorly, compressed posteriorly. Head large and tumid, entirely naked and without raised glandular ridges; chin without barbles. Top of head flat, snout rounded, the interocular space much greater than the eye diameter. Mouth rather large, a little oblique, the maxillary reaching to below the middle of the eye. Each jaw with three rows of small simple teeth, which are fixed and subequal in size; palate smooth. Tongue rounded in front, adnate to the floor of the mouth. Shoulder-girdle without cutaneous flaps. Gill-openings wide, but with a broad interspace between them.

Scales mostly cycloid, finely ciliated behind the pectorals. They are rather irregularly arranged, and are smallest anteriorly, becoming larger on the caudal peduncle. They extend forward to above the operculum, leaving a naked space on the nape backward to the first dorsal spine; breast naked, as is a space behind the pectorals and the bases of the dorsal and anal fins. There are about thirty-six to forty-six scales from behind the middle of the pectoral to the caudal fin, and about thirteen or fourteen between the soft dorsal and the anal.

First dorsal commencing above the middle of the pectoral; its spines are short, the fourth the longest, and much shorter than the rays: third dorsal ray longest, the succeeding rays decreasing slightly backwards. Anal commencing under the third, and terminating beneath the last dorsal ray; its rays increase in length to the second last. Ventrals small, inserted in advance of the pectorals; they are completely united and have a broad basal membrane. Pectorals rounded, the median rays longest, without free silk-like rays; their bases are very broad. Caudal more or less rounded, the lower rays sometimes worn shorter than the upper ones.

Colour.—Light brown after long preservation in spirit, with about six darker cross-bars on the back, which unite with others on the sides, leaving whitish interspaces between them. Head mottled with brown; a dark bar on the cheek from below the eye. Spinous dorsal dark brown, blackish posteriorly, with a broad white intramarginal band; soft dorsal

brown with darker mottling, and the margin white. Anal brown with a white margin. Caudal with irregular rows of dark spots. Pectorals more or less brown with a lighter basal bar.

Described from four specimens selected from a series of thirteen, 25-58 mm. long. The example figured is 53 mm. long.

I have failed to determine which, if any, of the numerous subdivisions of *Gobius* will accommodate this species.

Loc.—Strangways Springs, Lake Eyre Basin, South Australia.

(GOBIUS) LIDWILLI, *sp. nov.*

(Plate xxxi. ; fig. 2.)

D. vi. 7 ; A. 7 ; P. 14 ; V. i-5 ; U. 13-14. Scales 24. Depth 5 in the length to the base of the tail ; head 3.3 in the same. Eye 2.5 in the head. Third dorsal ray 1.7, fourth anal ray 1.8 in the head.

General form robust, cylindrical anteriorly, compressed posteriorly. Head rather broad and flattened above, the interorbital space much narrower than the very large eye. Snout short, rounded anteriorly. Head entirely naked, with a few minute and very indistinct rows of pores on the sides. Mouth small, very oblique, the maxillary reaching to below the anterior portion of the eye. Each jaw with simple and apparently fixed teeth, which appear to be arranged in two rows anteriorly ; vomer and palatines toothless. Tongue broadly rounded, and not adnate to the floor of the mouth anteriorly. Gill-openings wide, but with a broad interspace between them. Free edge of the shoulder girdle smooth, without cutaneous lobes or tubercles.

Scales large, strongly ctenoid, and subequal in size. There are about twenty-four between the operculum and the base of the tail, and about eight between the origin of the soft dorsal and the anal. They extend forward to the operculum above, and to behind the pectoral and ventral fins below, leaving the breast and nape bare.

First dorsal fin rounded, the third spine longest, but much shorter than the highest ray; the sixth is widely separated from the others. Soft dorsal rather angular, most of its rays bifid, the third the longest. The anal commences slightly farther back than the second dorsal, and though less angular, is similar in form. Pectoral rounded, all its rays simple, and none of them free; the medium rays reach back to below the origin of the soft dorsal. Caudal truncate, its outer rays simple, the others bifid. Ventrals large and wholly united, with a broad basal membrane; its rays are branched, and the longest reach back to the first anal ray.

Colour.—Translucent green, with darker cross-bars and blackish spots. There are about seven bars across the back, with others corresponding to them on the ventral surface; both these are connected with intermediate lateral spots. Head with numerous spots and bars; a broad band from below the eye across the cheek. Anterior portion of the first dorsal black, the remainder transparent (orange in life). Soft dorsal, anal, pectoral, and caudal fins each with a large basal spot.

Described and figured from a specimen $15\frac{1}{2}$ mm. or $19/32$ of an inch long. It is one of the largest of many specimens which do not appear to differ from each other in their general characters. Though so small, they are apparently adult, since the dissection and microscopical examination of their reproductive organs indicates the presence of ova. Further, the black and orange colour-marking of the dorsal fin in life is more striking than the imperfect colouration common to young fish.

This minute goby, which, if adult, bears the distinction of being one of the smallest vertebrates⁹, occurs in shoals along the oyster-covered rocks in the salt-water reaches of Cowan Creek, near Sydney. It remains within a few feet of the shore, and may be obtained in quantity with a small scoop-net. It is evidently carnivorous, since a small crustacean was observed in the stomach of one dissected. My attention was first drawn to this species by Dr. Mark C. Lidwill, who observed it while in the quest of somewhat larger game, and it is therefore associated with his name.

⁹ Jordan—Guide Study of Fishes, ii., 1905, p. 467.

I am unable to refer the species to any of the subdivisions of *Gobius* known to me. It bears a striking resemblance to some of the equally small species of the Eleotrid genus *Eviota*, Jenkins¹⁰.

Loc.—Saltwater reaches of Cowan Creek, near Sydney.

(GOBIUS) AUSTRALIS, *Ogilby*.

(Plate xxxi.; fig. 3.)

Gillichthys australis, Ogilby, Proc. Linn. Soc. N.S.Wales, (2), ix., 1894, p. 367.

Generic characters.—Head and body strongly compressed. Body covered with large, ctenoid scales, which extend forward to the nape above, and cover the breast and base of the pectoral below; there are from twenty-eight to thirty between the operculum and the tail. Operculum with a few large scales, the rest of the head naked; a few rows of minute pores on the sides of the head, and some larger open pores on the upper surface and preopercular margin. Mouth large, the maxillary reaching to behind the eye in females, farther back in males. Upper jaw with three or four pairs of canines anteriorly, followed by a narrow band of smaller teeth which extend along the sides and become uniserial posteriorly; mandibular symphysis crowded with larger teeth, including canines, the sides with a single series of smaller ones; all the teeth are simple and fixed: palate toothless. Tongue rounded and free from the floor of the mouth anteriorly. Gill-openings wide, separated by a rather narrow interspace; gill-membranes forming a fold across the isthmus. Free edge of shoulder-girdle smooth or with a single indistinct tubercle. No barbles.

Ventrals united, free from the belly, with one spine and five rays. Pectorals without free rays. Dorsals separate, the first with six spines; second dorsal and anal short, with about seven or eight rays. Caudal rounded, not elongate.

¹⁰ Jenkins—Bull. U.S. Fish. Comm., xxii., 1903, p. 501.

This species has been placed in *Gillichthys* by Ogilby, but it has no affinity with that genus. It differs from *G. mirabilis*, Cooper¹¹, in its compressed body and large scales, while the maxilla is not produced beyond the mouth opening.

The accompanying figure is prepared from a beautifully preserved example 47 mm. long, which is one of three collected by Mr. J. H. Wright of the Australian Museum.

Loc.—Sans Souci, Botany Bay, New South Wales.

Addendum.

Family LUTIANIDÆ.

PARACESIO PEDLEYI, McCulloch and Waite.

Paracesio pedleyi, McCulloch and Waite, Trans. Roy. Soc. S. Austr., xl., 1916, p. 440, pl. xlii.

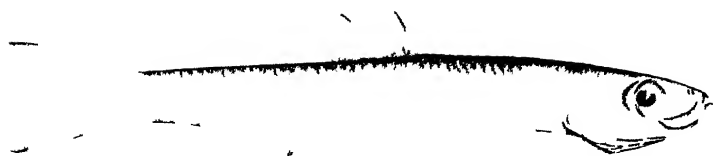
An example, 240 mm. long from the snout to the end of the middle caudal rays, was recently secured by Inspector Smithers in the Sydney markets. It differs from the larger type specimen in having the upper profile of the head less tumid; the eye is larger, 3.4 in the head, and the canine teeth are less developed; it also lacks the dark band which crosses the body from the back to the abdomen in the type. Two other larger examples from Lord Howe Island show that these differences are merely due to age.

Loc.—Supposed to have been taken near Byron Bay, New South Wales.

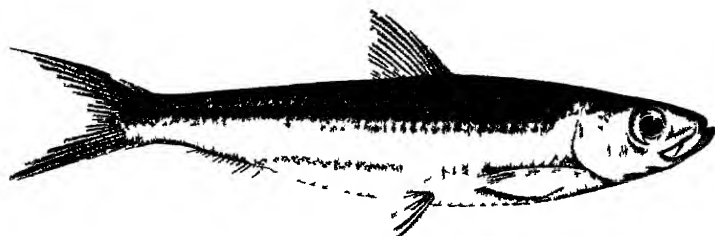
¹¹ Jordan—Guide Study of Fishes, ii, 1905, p 463, fig 419.

EXPLANATION OF PLATE XXIX

- Fig 1 *Hyperlophus vittatus*, Castelnau From the type of *H. copii*, Ogilby, 81 mm long, from Maroubia, near Sydney .
- Fig 2 *Hyperlophus vittatus*, Castelnau From the type of *H. sprattellides*, Ogilby, 82 mm long, from the Parramatta River, Port Jackson
- Fig 3 *Hyperlophus translucidus*, McCulloch Type, 58 mm long, from Sans Souci, Botany Bay
- Fig 4 *Potamulosa novæ-hollandiæ*, Cuv & Val A specimen 177 mm long, from the Hastings River, New South Wales

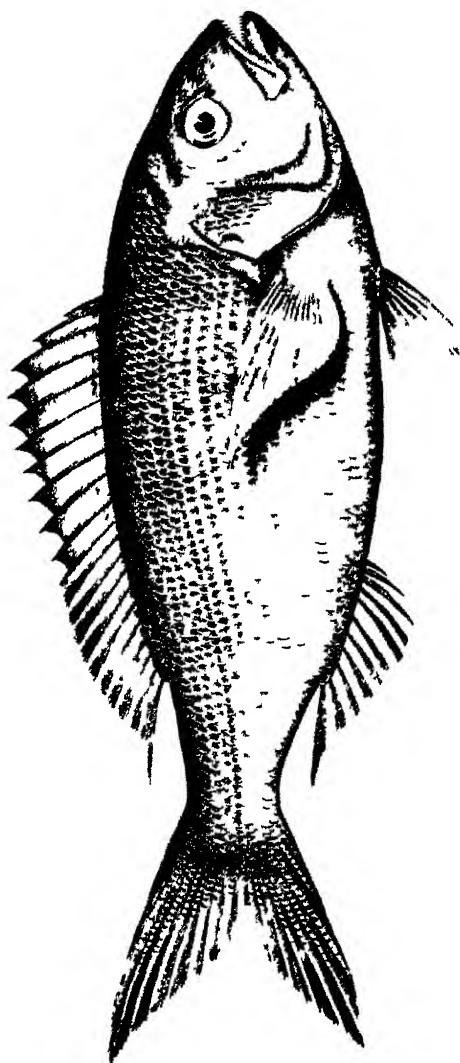


1



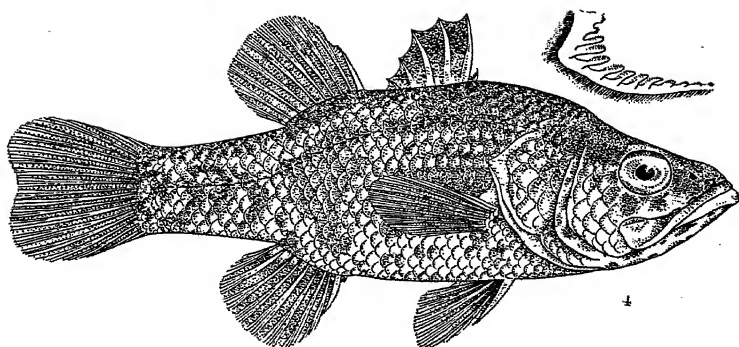
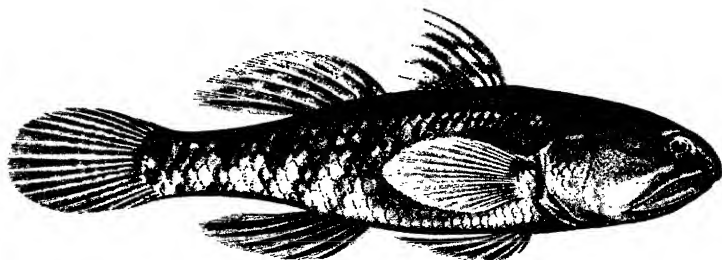
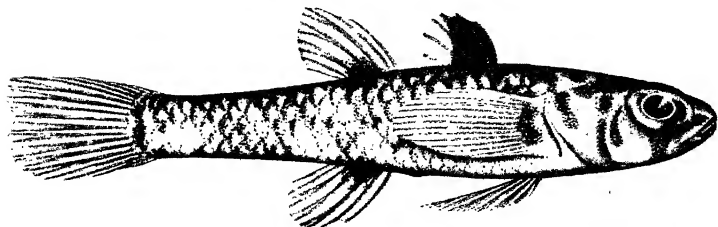
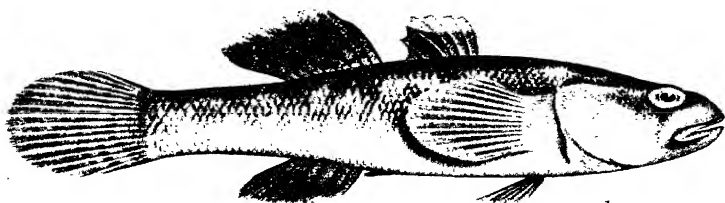
EXPLANATION OF PLATE XXX

Aplousous, Castelnau A specimen 410 mm long, from
Byron Bay, New South Wales



EXPLANATION OF PLATE XXXI.

- Fig. 1. *Gobius eremius*, Zietz. A specimen 53 mm. long from Strangways Springs, South Australia.
- Fig. 2. *Gobius lidwilli*, sp. nov. Type, $15\frac{1}{2}$ mm. long, from Cowan Creek, near Sydney, New South Wales.
- Fig. 3. *Gobius australis*, Ogilby. A specimen 47 mm. long from Sans Souci, Botany Bay, New South Wales.
- Fig. 4. *Glossamia gillii*, Steindachner. A specimen 111 mm. long, from Eidsvold, Burnett River, Queensland.



ADDITIONS TO THE ETHNOLOGICAL COLLECTIONS,
CHIEFLY FROM THE NEW HEBRIDES.

By R. ETHERIDGE, JUNR., Curator.

(Plates xxxii.-xxxix.)

The New Hebridean collection has from time to time received some very valuable additions, amongst others the following interesting objects:—

I.—STONE FOOD-DISHES.

The largest of these (Pl. xxxii.), evidently an adapted block of stone, is broad oval in form, with a rounded rim, or periphery, of variable width. It measures two feet by nineteen inches in cross diameters, the full height is five inches, decreasing to two inches inside, and is ninety-six pounds in weight.

It was presented by Mr. J. E. Fysh, of "Big Bay," Santo, who states it to be about the size and shape of the to-day's wooden food dishes. The dish was, for a long time, lying in the village, close to Mr. Fysh's house, but when a new position for the village was selected, and removal took place, the dish was left behind, it being taboo; the villagers professed total ignorance of its origin or age. Dr. C. Anderson informs me the stone is a volcanic tuff.

Dr. W. T. Brigham has figured a similar flat but round dish, taken from "a heiau [temple] on Molokai, [and] is the largest worked stone dish of Hawaiian origin I have yet seen."¹ Elsewhere Dr. Brigham says his dish is of compact lava, twenty inches in diameter, and used as a receptacle for small offerings in the temple.² Except for its circular outline the Hawaiian utensil is quite of the same type as the present example from Santo.

A still larger, but worn dish, is figured by the same author from Nihoa Island, "used for grinding awa."³

¹ Brigham—Occ. Papers Bernice Pauahi Bishop Mus., I., No. 2, 1900, p. 20, fig. 6.

² Brigham—Memoirs *Ibid.*, I., No. 4, 1902, p. 52, p. 54, fig. 51.

³ Brigham—Memoirs *Ibid.*, pl. xliii., fig. 1227.

The next in size, also of volcanic tuff, is a large shallow oval dish, seventeen inches long, fourteen inches wide, two and a half inches high, one and a quarter inches within, and the weight twenty-eight pounds (Pl. xxxiv., fig. 1).

A small mortar-like dish, or bowl, is represented in Pl. xxxv., fig. 1, with well-rounded sides and seamed with cracks filled with spar. It is composed of a light-coloured stone, probably a consolidated coral-rock. It is five inches long, four and a half inches wide, two inches high, one and a quarter inches within, and is one and a half pounds in weight.

The fourth and last dish is more or less pyriform with rounded sides, and at one end two mammillary projections (Pl. xxxiii.) as in the bowl about to be described; this is also of volcanic tuff. The measurements are:—Thirteen and a half inches long, ten and a half inches broad, three inches high, one and three quarter inches inside height, and a weight of twelve and a half pounds.

All four utensils are from Tavanapni and Narata Plantation, St. Phillip and St. James' Bay, Santo, otherwise known as "Big Bay."

II.—STONE BOWL.

Portion of a much-worn argillaceous limestone bowl (Pl. xxxvi., fig. 1). when entire (Pl. xxxvii., fig. 1) oblong oval, in its present condition comprising a little more than one half the original. When placed in position it is four and a half inches high, six inches long, and three and a quarter inches deep inside; the aperture is four inches across. The thickness is unequal, but on the fractured side it is one inch and an eighth thick. At the end, an inch below the rim, is a flattened projection which is, no doubt, a modified handle, in fact this becomes quite apparent when the restored vessel is examined (Pl. xxxvii., fig. 1).

The block of stone was evidently chipped into shape by successive blows with a pointed tool, and hollowed by the same process, and both externally and internally the pitting so caused is visible. On each side of the bowl is a kind of panel; one is one and three quarter inches square, and

divided into twenty parallelograms or pellet-like partitions arranged in series of five longitudinal and four transverse. The other panel is one and a half inches by two inches and yet imperfect; in each case the longer axes of these pellets are parallel to the longer axis of the bowl.

The form is not that of any Santo pottery I have seen, but the small parallelograms on the decorative panels greatly resemble the rows of pellets that ornament the necks of Santo pots; they are also seen on Fijian glazed ware.

Very little appears to have been published on the Santo pottery. All that Codrington⁴ says is that "pottery . . . being present in well-known forms in Fiji, and in ruder unglazed dishes in Espiritu Santo." Of the latter the Rev. Robert Steel said:—"They make a kind of unglazed pottery, which they use for culinary purposes; but they all say their fathers made a far superior kind."⁵

In Mr. G. Collingridge's translation of the "Spanish Description of the Big Bay of Santo" occurs the following passage:—"The natives make from a black clay some very well-worked pots, large and small, as well as pans and poringers in the shape of small boats."⁶ This bowl (Pl. xxxvi., fig. 1; Pl. xxxvii., fig. 1) is not unlike a boat.

Mr. Fysh, to whom the Trustees are indebted for this bowl also, suggested a Spanish origin, but this is untenable, for in Captain James Burney's account⁷ of Pedro Fernandez de Quiros' stay in the Bay of St. Philip and St. James, it is said the people "make earthen vessels; work on marble and on stone." The sum of this is, therefore, that pottery making was an established industry around "New Jerusalem," on the bay in question, at Espiritu Santo, previous to 1606 A.D.!

⁴ Codrington—*Melanesians*, 1891, p. 315.

⁵ Steel—*New Hebrides and Christian Missions*, 1880; p. 332.

⁶ Collingridge—*First Discovery of Australia and New Guinea*, 8vo. Edit., 1906, p. 107.

⁷ Burney—*Chronological History of the Voyages and Discoveries in the South or Pacific Ocean*, Pt. II., 1679—1620, 1806, p. 309.

A recent account, speaking of Big Bay says:—"We found they are expert potters. Nearly all their culinary utensils are made of hand pottery-ware. We made quite a large collection of many different sorts of hard red pottery, such as pots, vases, cups, mugs, basins, plates, saucers, dolls, pigs, and idols."⁸

The bowl was picked up near an outcrop of "white sandstone" [? argillaceous limestone],⁹ the place being taboo, on Tavanapni and Narata Plantation, St. Phillip and St. James' Bay,¹⁰ Santo.

III.—KAVA STONE.

This peculiar heavy, torpedo or cigar-shaped stone (Pl. xxxviii., fig. 1) was also obtained by Mr. Fysh. It is of argillaceous limestone similar to the bowl (Pl. xxxv., fig. 1), with a circumference at the centre of two feet eight and a half inches; the weight is one hundred and twenty-four pounds. The apex is obtusely pointed, but considerable abrasion has taken place at the base.

Mr. Fysh has supplied me with the following information:—In the making of a chief a feast was inaugurated, and at its conclusion the chief-to-be had to reside in the house wherein reposed this stone, for four to five weeks. During this period of seclusion the only drink permitted him was Kava, and after each potation the dregs were cast on the Kava stone—in fact a kind of libation; kava was reserved for the chiefs, to the common herd it was taboo.¹¹ No one dare touch this fetish, anyone doing so, even by accident, would break out into sores and boils, notwithstanding the payment of a pig or pigs to the paramount chief.

⁸ Rannie—My Adventures amongst South Sea Cannibals, 1912, p. 166.

⁹ The coast of Espiritu Santo I. is composed of coral and coral rock. This becomes elevated to the north of the point off which lies Tetuba, a small islet, only a few feet above sea level. The same formation underlies the soil for some miles back into the interior, until it meets the volcanic tufa of the mountains (Wawn—*The South Sea Islanders*, &c., 1893, p. 86.)

¹⁰ The actual name given to this bay by De Quiros was that of "San Felipe de Santiago" (Burney, *Loc. cit.*, p. 289).

¹¹ F. A. Campbell refers to the use of Kava, "which grows extensively on the southern islands of the group, but nowhere better than in this district (*A Year in the New Hebrides*, &c., 1873, p. 166).

It may be that this stone is akin to the *navilah* of Erromanga. The moon is symbolised by a *navilah*, in the form of a ring or roughly-shaped crescent. Writing of this stone cult, the Rev. Dr. H. A. Robertson remarked¹²:—"Stones, large and small, of peculiar shape or origin, in which some supernatural power is supposed to reside, because of their connection with a spirit or spirits."¹³

In many of the New Hebridean islands "the chiefs possess strangely shaped stones to which they attribute remarkable powers—of making the yams grow large, the cocoanuts flourish, and the pigs to multiply. To some they ascribe destructive powers. A spirit, sometimes a ghost, is supposed to exercise its powers in connection with the stone; and the possessors of such stones have great *mana* which they will employ on behalf of others in return for fees."¹⁴ The spirit does not dwell in the stone, but is associated with it, and may be near at hand.¹⁵

This association of spirits with stones in the New Hebrides is exhaustively dealt with by Codrington.¹⁶ He said, "any fanciful interpretation of a mark on a stone or of its shape was enough to give a character to the stone; and to the spirit associated with it."¹⁷

Loc.—From St. Phillip and St. James' Bay, or Big Bay, Santo. Mr. Fysh says:—"I have sent two Kava stones at various times—one from off my land at South Big Bay, about nine miles north of the Jordan River, and the other about twenty-five miles north of the same."

¹² Robertson—Erromanga the Martyr Isle, p. 435.

¹³ A. W. Murray refers to the *navilah*—"a species of idolatry connected with the worship of the moon, the image of which they exhibit at their idolatrous feasts (*Missions in Western Polynesia*, &c., 1863, p. 209).

¹⁴ Lamb—Saints and Savages. The Story of Five Years in the New Hebrides, 1905, p. 213.

¹⁵ Lamb—*Loc. cit.*, p. 114.

¹⁶ Codrington—The Melanesians, 1891, p.p. 181-5.

¹⁷ Codrington—*Loc. cit.*, p. 182.

IV.—MISSILE STICKS FROM TANNA AND FUTUNA.

So far as I have been able to gather, practically very little has been written on these interesting objects, apparently restricted to the above neighbouring islands. They are composed of two substances, stone and coral.

The collection contains in all five olivine basalt and four coral projectiles, and of which the following are the details:—

Stone.

1. Faintly curved, 19½" long, oval in section, weight 3lbs. From Tanna, presented by Capt. A. H. C. C. Home, R.N. (Pl. xxxviii., fig. 2).
2. Faintly curved, 17" long, round in section, weight 2½lbs. From Tanna, presented by the same donor.
3. Straight, 10½" long, round in section, weight 2lbs. 13oz. Called *Kasso-asso*, from the village of Gwin-ap, Central Tanna, presented by W. H. Truss (Pl. xxxvi., fig. 2).
4. Curved, 11" across curve, round in section, weight 1lb. 13oz. From Tanna, presented by the Rev. W. Laurie.
5. Slightly curved, 10" long, round in section, weight 2lbs. From Erromanga.

These stone missiles are either straight, faintly bent, or appreciably curved, round or oval in section, and with a fairly uniform girth of four inches.

Coral.

1. Straight, 2ft. 4½in. long, round in section, weight 4lbs. 2ozs. A species of *Astræa*, from Futuna, presented by Capt. G. Braithwaite.
2. Straight, 2ft. 3in. long, round in section, weight 2lbs. 11oz. A species of *Cœloria* from Futuna, presented by the same donor.
3. Straight, 1ft. 11in. long, round in section, weight 3lbs. 2oz. Species of *Astræa*, from Futuna, presented by Capt. A. H. C. C. Home, R.N. (Pl. xxxviii., fig. 3).
4. Straight, 2ft. long, round in section, weight 3lbs. Species of *Astræa*, from Futuna, presented by the same donor.

In forwarding two of the olivine-basalt missiles from Gwin-ap Village, Central Tanna, the late Mr. W. H. Truss wrote:—"One of their old throwing stones, which were much used many years ago, but are not now made." At the village in question these missiles were known as *Kasso-naso*.¹⁸

One of the first writers to call attention to these Tanna stone throwing sticks was, in all probability, the Rev. Dr. G. Turner, who said, "the *kawas* is a long piece of stone, which they throw with deadly precision when they are within twenty yards of their victim." And again:—"It is about the length of an ordinary counting-house ruler, only twice as thick."¹⁹

Commander J. G. Goodenough, R.N., saw these weapons in the hands of the Hill Tannese at Port Resolution. "The article which takes most trouble to make is, I suppose, the kawass, or throwing stone, about a foot long, and of the thickness of a thick round ruler."²⁰

On Futuna, or Erroman Island, no great distance from Tanna, coral takes the place of olivine-basalt. The first in our collection from this locality was presented by Capt. G. Braithwaite, of the "Dayspring" (No. 1 in the previous list.)²¹

The coral missiles are invariably straight, and of much larger bulk than the basalt sticks of Tanna. Two genera are recognisable, *Astræa* and *Cœloria*. The colonies from which the missiles were prepared must have been of considerable size, possibly from blocks from the upraised bed of the island, where "there are traces of four or five different upheavals."²²

¹⁸ Also spelt *cawasse*—"The men, throwing away their spears, bows, and cawasses, formed themselves into a circle" (Palmer—*Kidnapping in the S. Seas*, 1871, p. 37.

¹⁹ Turner—*Nineteen Years in Polynesia*, 1861, p. p. 23 and 81.

²⁰ Goodenough—*Journal of 1876*, p. 278.

²¹ Ramsay—*Abst. Proc. Linn. Soc. N. S. Wales*, 29th Oct., 1894, p. v.

²² Steel—*The New Hebrides and Christian Missions*, 1880, p. 129.

Capt. [Commodore] J. E. Erskine, R.N., saw at Port Resolution, Tanna, "a stone of the shape of that by which scythes are sharpened in England, and about a foot long, which they make from the coral rock, and use either for striking or throwing."²³ This was confirmed in the first instance by A. H. Kiehl, who stated that on Tanna "branches of coral rock, about a foot in length and one or two inches in diameter, are used along with the other weapons. They throw them at each other."²⁴ And the same is also mentioned by Dr. C. E. Meinicke.²⁵

That both coral and basalt missiles are, or were, used on Tanna appears to be a fact well established for long before either Capt. Erskine or Mr. Kiehl saw them at Port Resolution, that grand old navigator and authority, Capt. James Cook, R.N., wrote thus, through his historian-author, Hawkesworth:—"The stones they use are, in general, the branches of coral rocks from eight to fourteen inches long, and from an inch to an inch and a half in diameter. I know not if they employ them as missiles."²⁶

The New Hebridean island, Futuna, must not be mistaken for Fotuna, one of the Hoorne Islands, away to the north-east of Fiji. Unfortunately both are sometimes used by Authors with an *o*, and again both with a *u*. It would save confusion and tribulation of spirit if Futuna of the New Hebrides were simply known by its native name of Erronan. By Cook it was called "Footoona."

Stick missiles are used by the natives of Nieuve, or Savage Island. Mr. J. L. Brenchley said that stalagmites were employed as missiles, obtained from pools in the interior of the island. "They are made use of as projectiles in their combats, and which they adroitly throw without the aid of a sling."²⁷

²³ Erskine—Journ. Cruise Islands W. Pacific, 1853, p. 319.

²⁴ Kiehl—Anthropologia, I., 1873-5, p. 135.

²⁵ Meinicke—Die Inseln des Stillen Oceans, 1875, p. 203.

²⁶ Hawkesworth—Cook's Voyage towards the South Pole and round the World, 1772-75, 3rd Edit., II., 1779, p. 82.

²⁷ Brenchley—Cruise of H.M.S. Curaçoa among the South Sea Islands in 1865, pp. 25 and 28.

The basalt missile said to have been found on Erromanga was possibly taken there from Tanna, but the locality is open to doubt.

V.—“SLAYING” STONE.

A cylindrical, or perhaps even an obtusely quadrangular stone (Pl. xxxviii., fig. 4), three feet one inch long, with an average circumference of thirteen and a half inches, but at one end tapering to nine inches girth; it is blunt at both ends, and weighs forty-five pounds. It is, like the stone missiles, also of olivine basalt.

I do not think this is a converted stone; it has every appearance of natural wear and tear, if shaped it must have been at the expense of enormous labour. On grasping with the hands a distinct quadrangular section becomes appreciable, whilst a quadrangular appearance is imparted by four pronounced longitudinal grooves, or valleys, extending the entire length of the stone.

This interesting object was, as in the case of one of the basalt missiles, presented by Mr. W. H. Truss, and is also from Gwin-ap Village, Central Tanna.

Mr. Truss supplied me with the following information:—The stone was known as “*mul-a-mal*,” and kept in the village as a means of despatching a victim. The latter was sometimes seized and held, when the man told off as executioner would raise it above his own head and crash in the skull of the victim by simply allowing it to fall by its own weight, and this was performed openly or secretly; the victim was always eaten.

The age of the stone was unknown, but it was credited with having been the instrument of death of many people.

VI.—MALLICOLLAN POTTERY.

The Rev. F. J. Paton, who was stationed on Mallicolo, forwarded to the Australian Museum a number of fragments of pottery, in fact potsherds, from that island. The donor informed me that the pieces were dug up in yam gardens or old village rubbish heaps. “Perhaps it has not been made

for a hundred years, certainly not in living memory. I have never seen a complete Mallicollan pot, and it is a lost art."²⁸ This is clearly one of those cessations that would come under Dr. W. H. R. Rivers' term, "the disappearance of a useful art."²⁹

There are numerous pieces, and most of them much worn. With the exception of about three of those in which any decoration is visible, the motive is very peculiar and quite new to me from any part of the South Pacific. The motive in question resembles, more than anything else, the scale armour of a palæoniscid fish. The individual scales very roughly laid on in simple overlapping oblique series (Pl. xxxiv., fig. 2, Pl. xxxv., fig. 2, Pl. xxxvi., fig. 3), are more or less imbricate, and at times assume a tear-like outline (Pl. xxxiv., fig. 3, Pl. xxxvii., figs. 2, 3). This is the predominant motive, but one small fragment has a few parallel groovings (Pl. xxxiv., fig. 4). The largest piece is evidently derived from a large plain cooking pot, similar both in colour and texture to those of Port Moresby, and one form of Admiralty Island pot. Other than this, the "fish scale" pattern predominates with one exception. In this, the most elaborate of all the potsherds, there is a central V-shaped figure, with lateral oblique grooves, deflected on either side, and there again bordered by horizontal lines of longitudinal V or V-shaped fret (Pl. xxxv, fig. 3).

The only article I know of on New Hebridean pottery is a short note by the Rev. J. Noble Mackenzie,³⁰ who said though its manufacture is now (1901) confined to a few isolated spots on the west of Santo, there is evidence to show that it was in times past made on other islands of the Group, as similar pottery pieces to that of Santo have been dug up in several islands to the south.

One naturally turns first, for comparative purposes, to the neighbouring island of Espiritu Santo, commonly known as "Santo," but on twenty-four pots from there examined there

²⁸ Letter dated 18th March, 1903, addressed to Mr. S. Sinclair, Secretary, Australian Museum.

²⁹ Rivers—Brit. Assoc. Report for 1912 (1913), p. 598.

³⁰ Mackenzie—New Hebrides Magazine, No. 4, 1911, p. 21.

is no trace of similar ornament. Again, the glazed and artistically decorated ware of the Fiji Group offers no resemblance, nor need the large deep pots of New Caledonia be considered. Going farther afield, the facies of the best preserved piece (Pl. xxxv., fig. 3) of this Mallicollan pottery seems in a broad sense to resemble that on potsherds found in a similar position to the latter, by Mr. P. J. Money at Rainu, near Wanigera Creek, Collingwood Bay, East New Guinea. The potsherds in question were found on excavating the mound sites of vanished villages, all knowledge of which is denied by the existing inhabitants of that region. The motive on these pieces is quite distinct from that of the fine pottery now made there. These Rainu potsherds, Mr. Money informs me, are believed to have been the work of a people known as the Geragi, now extinct, who spoke a language quite different to that now spoken by the Collingwood Bay people, which is termed "Aribi." With these pottery pieces were associated carved shells (much decayed), bone articles, stone head-rests, &c. The Rev. J. N. Mackenzie states that the words denoting a pot in New Guinea (part not stated) and Santo are the same.

In the tear-like motive there is a general resemblance to some of the designs seen on Arkansas burial-mound pottery.

The locality of the Mallicollan fragments is Onua Village, on Onua Bay, East Mallicollo.

VII.—NASSAU ISLAND ADZE-HEAD.

For an opportunity of describing this very interesting object (Pl. xxxix.), I am indebted to Prof. John Macmillan Brown, of Christchurch, New Zealand, who obtained the loan of it from Capt. E. F. Allen, of the s.s. "Dawn," Samoa Shipping and Trading Co. Ltd., Sydney.

It appears that a comparatively recent tidal-wave swept ashore at Nassau Island, removing a very large quantity of soil over an area of five acres, and to a depth of six feet, when this implement, and a sharpening stone were exposed. These were underneath a skeleton, which, on exposure, at once crumbled to a mass of dust.

Nassau Island (possibly identical with Ranger Island) lies in Lat. $11^{\circ} 33' S.$, Long. $165^{\circ} 25' E.$, immediately south of the Danger Islets, and north-west of the Hervey or Cook Group. It was discovered in March, 1835, by the Captain of an American whaler; it is about fifty feet high, with a fringing reef. The island was uninhabited when discovered, but in 1877 one white man and two Danger Island natives with their wives took up residence there.³¹ In 1892 Nassau Island was annexed by Great Britain and incorporated with the Line Islands; it now forms a dependency of New Zealand.³²

The implement exhibits the following characters and proportions :—

	Ft.	In.
Length overall, and measured on the level.....	1	0
Tang, from the shoulder to the poll, on the level	—	$3\frac{1}{2}$
Width across the slightly rounded cutting edge	—	$3\frac{1}{2}$
Width at the poll	—	$1\frac{1}{2}$
Length of the blade (oblique)	—	$3\frac{1}{4}$
Width at the shoulder	—	$2\frac{1}{2}$

The adze is U-backed, that is, it is markedly concave longitudinally from the poll to the posterior margin of the blade, and practically flat transversely; the front face is flat longitudinally and transversely from the shoulder to within about one inch of the cutting edge, where there is a slight rise. The sides are quite flat transversely, and sub-parallel to one another. The tang is plano-convex, plain or flat on the back, convex on the front face. At the poll the adze projects downwards, or at right angles to the longer axis, in two nipple-like projections. The thickest part is immediately at the posterior edge of the blade, *i.e.*, at that point where the longitudinal concavity of the back ceases forward; here it is $2\frac{1}{2}$ in., at the shoulder it is 2 in., and mid-way between the two $1\frac{1}{2}$ in. The angle of inclination of the blade to the axial plane from its posterior margin to the cutting edge is 21° , and of the tang 14° . The implement is composed of a light grey volcanic tuff, and the weight is five and a quarter pounds.

³¹ Findley—Directory S. Pacific Ocean, 5th Ed., 1884, p. 652.

³² Pacific Islands, iii. (Eastern Group), Sailing Directions, 4th Ed., 1909, pp. 187-8.

In the Dominion Museum at Wellington is the cast of a fine adze-head, of which Mr. Elsdon Best says³³:—"The back of the tool is concave longitudinally to an extent but seldom seen, and convex transversely." The present implement is very similar in this respect, although flat transversely instead of convex.

A similar U-backed and flat-faced tool, with a long blade, is figured by Dr. W. T. Brigham as Hawaiian.³⁴

The all-important point of interest attached to this adze-head is the terminal nipples or horns of the tang. Mr. Elsdon Best figured an implement which he described as "one of the most peculiar forms in the Museum" [Dominion]³⁵ in that the small poll has a curious lateral projection, "which may have served to hold this singular tool in the lashing." This statement is, however, to some extent discounted by one that immediately follows—"this tool may be a *poluki*, or pounder, that was used in the hand, not hafted." The lateral projection can be distinguished in the figure quoted, and I refer to it as the only instance but one other I have been able to find in literature.

The other instance is that of a small Chatham Island adze-head described by Mr. Best as follows³⁶:—"The chief peculiarity of this tool is at the poll, whereat two horns or projections have been left, one at each face corner, in order to contain the lashing." This is quite in accord with my view of the use of these similar projections on the Nassau Island implement.

The sharpening stone previously referred to is simply a roughly quadrangular piece of grey volcanic tuff.

³³ Best—Bull. Dominion Mus., No. 4, Stone Implements of the Maoris, 1912, p. 275, pls. xiv. and xv.

³⁴ Brigham—Mem. Bernice Pauahi Bishop Mus., I., No. 4, Ancient Hawaiian Stone Implements, 1902, pl. lv., fig. 3121.

³⁵ *Loc. cit.*, p. 276, pl. xvi., fig. 95.

³⁶ Best—*Loc. cit.*, p. 268, pl. xxi., fig. 85b.

Prof. Macmillan Brown examined the adze-heads in the Dominion Museum and wrote me as follows³⁷:—"There is the model or copy of a small one of the same type from the Chatham Islands with the same two nipples as on the specimen from Nassau. I may say that the Morioris of these islands have many things that differentiate them from the Maoris. They have wash-through canoes (*waku-patu*) for fishing; they sit with face to stern as in rowing. They have in their phonology the consonant *ch*, which appears in no other Polynesian dialect except Tongan. I have always thought they came from a group different from the Maoris. Their *waku-patu* remind me of the *balsas*, or boyant rafts, of the Peruvian coast. On Lake Titicaca I saw canoes made of reeds of much the same type (*i.e.*, wash-through) as the Moriori, and their attitude in propelling stands alone in Oceania, except in New Caledonia, where they had double canoe rafts with holes in the decking through which they punted their craft."

The occurrence of these lashing holders, or stops, on adzes found so far apart as the Chatham Islands and Nassau is both interesting and remarkable. The subject will, I hope, provide Prof. J. M. Brown with further matter for consideration in his well-known Pacific studies.

The evidence of "lost arts" throughout the South Pacific is slowly but gradually increasing. For instance, leaving out of consideration megalithic and cyclopean structures, we have the stone implements and figures found in the auriferous alluvium of the Yodda Valley Goldfield,³⁸ and the unknown pottery at Rainu, already mentioned, both localities in Eastern New Guinea. It will be remembered that these Rainu pots-herds are accompanied by incised shells,³⁹ but the "art of carving on hard shell is not now practised."⁴⁰ Travelling in a south-easterly direction we encounter the stone dishes and

³⁷ Letter dated 3rd November, 1915.

³⁸ Etheridge—*Rec. Austr. Mus.*, vii., 1, 1908, p. 24, pls. vi.-vii.

³⁹ Poch—*Mittl. Anthrop. Gesellsch. Wien.*, xxxvii., 1907, pp. 67-71, figs. 7 and 8; Etheridge—*Loc. cit.*, p. 27.

⁴⁰ Monckton—*Brit. New Guinea Ann. Report*, year 30th June, 1904.—*Commonwealth Parl. Papers*, 1905, No. 1, C. 700, p. 31, 4th plate.

pottery of Santo, the latter of a type different to that at present made on the island in question. Again, we are now in possession of the fact that the pottery art was at one time in vogue in Mallecollo, and according to the Rev. Mr. Mackenzie on other islands of the group as well.

To pass to another form of art, it is interesting to note that petroglyphs are to be seen on Aneityum Island. These are remarkable representations of the sun, moon,⁴¹ and other objects, "like what our ancestors did," say the natives.⁴² Others are present on Lilipa, or Protection Island, near Havannah Harbour. Still farther away are the petroglyphs of Pitcairn Island, which were there when the island was occupied by the mutineers of the "Bounty."⁴³

Too much stress cannot be laid on the Nassan axe-head, beyond the fact that the island was uninhabited as explained on p. 200.

It appears to me we have here traces, not only of "lost arts," but also of "lost races." In connection with the latter was Dr. H. B. Guppy's discovery of worked flints on the islands of Ugi and St. Christoval, in the Solomon Group.⁴⁴ These "are commonly found in the soil when it is disturbed for purposes of cultivation, and are frequently exposed after heavy rains," and consist of fragments of chalcedony, carnelian, and jasper. "Some were cores, others were flakes, resembling in their form, and often in their white colour, the flakes of the post-tertiary gravels."

⁴¹ Mr. A. W. Murray says that amongst the Aneiteumese "the sun and moon, especially the latter, hold a distinguished place" (*Missions in Western Polynesia, &c.*, 1963, p. 26).

⁴² Gunn—*New Hebrides Mag.*, No. 19, 1906, p. 16.

⁴³ Gunn—*Ibid.*, No. 20, 1906, p. 16, pl. p. 17.

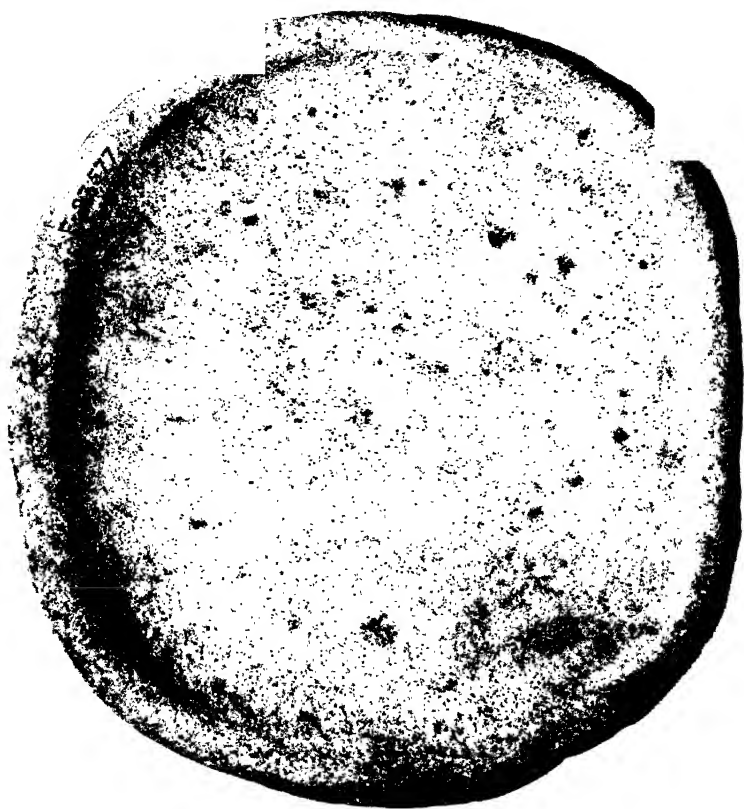
⁴⁴ Guppy—*The Solomon Islands and New Natives*, 1887, pp. 77-8.

EXPLANATION OF PLATE XXXII

Shallow, large, oval food dish of volcanic tuff :—

Length	1 ft. 5 inches.
Breadth	1 „ 2 „
Height .	0 „ $2\frac{1}{2}$ „
Inside ..	0 „ $1\frac{1}{4}$ „
Weight .	28 lbs.

Tavanapni and Narata Plantation, St. Phillip and St. James' Bay, or "Big Bay," Espiritu Santo.

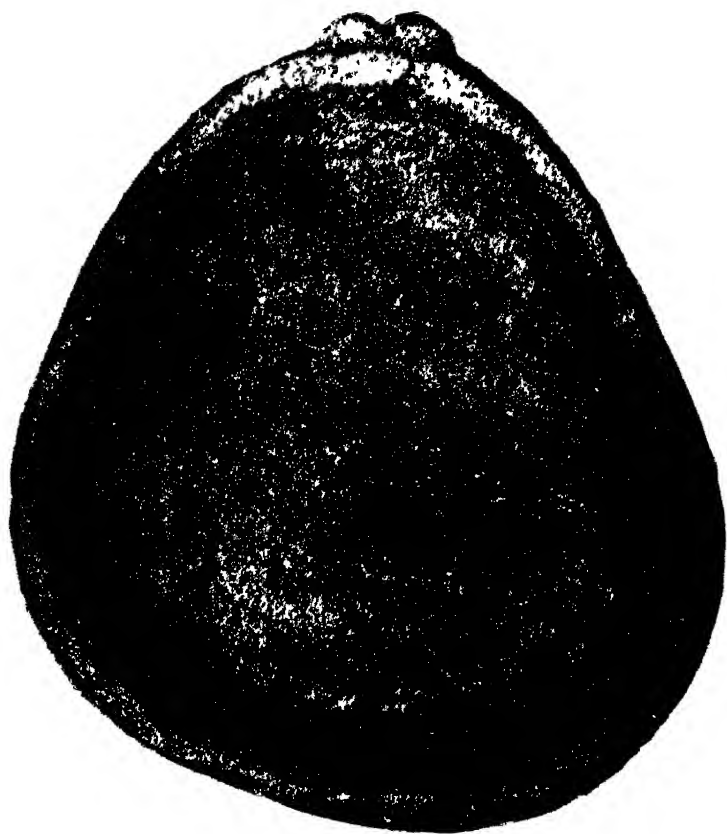


EXPLANATION OF PLATE XXXIII.

Pyriform volcanic tuff dish, with two mammillary projections at the smaller end:—

Length ..	.	1 ft. $1\frac{1}{2}$ inches.
Breadth .	.	0 „ $10\frac{1}{2}$ „
Height .	..	0 „ 3 „
Inside		0 „ $\frac{3}{4}$ „
Weight		$12\frac{1}{2}$ lbs.

Tavanapni and Narata Plantation, St. Phillip and St. James' Bay, or "Big Bay," Espiritu Santo.



EXPLANATION OF PLATE XXXIV.

Fig. 1. Volcanic tuff food dish :—

Length ...	2 ft.
Breadth... ..	1 „ 7 inches
Height ...	0 „ 5 „
Inside	0 „ 2 „
Weight	96 lbs.

Tavanapni and Narata Plantation, St. Phillip and St. James' Bay, or "Big Bay," Espiritu Santo.

Fig. 2 and 3. Potsherds with imbricate scale-like motive
Onua, East Mallicollo.

Fig. 4. Potsherd with parallel incisions, probably from the neck or beneath the rim of a receptacle. Onua, East Mallicollo.



1



3



4



EXPLANATION OF PLATE XXXV

Fig. 1 Small coral-rock mortar-like dish, or bowl —

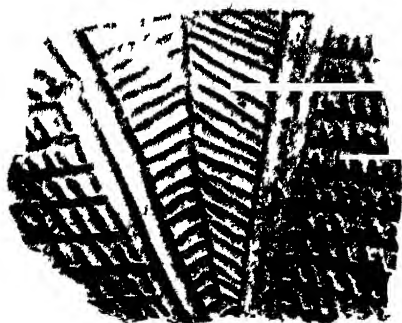
Length	0 ft 5 inches.
Breadth	0 „ $4\frac{1}{2}$ „
Height	0 „ 2 „
Within	0 „ $1\frac{1}{4}$ „
Weight	$1\frac{1}{2}$ lbs

Tavanapni and Nariata Plantation, St. Phillip and St. James' Bay, or "Big Bay," Espiritu Santo

Fig 2. Potsherd, bearing fish-scale motive

Fig 3 Potsherd with the most elaborate motive of all the Mallicollan pieces—a central V-shaped figure with lateral oblique grooves separated in the middle line by a longitudinal incision, and bordered on each side by more or less horizontal lines of simple fret.

The originals of Figs 2 and 3 are from Onua, East Mallicollo



3



2

EXPLANATION OF PLATE XXXVI.

Fig. 1. Portion of much worn argillaceous limestone bowl with projecting handle.

Tavanapni and Narata Plantation, St. Phillip and St. James' Bay, or "Big Bay," Espiritu Santo

Fig. 2. Olivine-basalt missile club, known as *Kasso-waso*:—

Length	10½ inches.
Section	circular.
Weight	2 lbs. 13 ozs.

Gwyn-ap Village, Central Tanna.

Fig. 3. Potsherd, with scale-like motive. Onua, East Malli-collo.



C. CLUTTON, Austr Mus, photo.

EXPLANATION OF PLATE XXXVII.

Fig. 1. The subject of Plate xxxvi., fig. 1, restored :—

Height		0 ft. 4½ inches.
Length .	.	0 „ 6 „
Inside ..	.	0 „ 3¼ „
Aperture	.	0 „ 4 „
Thickness	.	0 „ 1½ „

Tavanapni and Narata Plantation, St. Phillip and St. James' Bay, or "Big Bay," Espiritu Santo.

Figs. 2 and 3. Potsherds, displaying tear-like motive.

Onua, East Mallicollo.



C. CLETON, AUSTR. MUS., PHOTO.

EXPLANATION OF PLATE XXXVIII.

Fig. 1. Kava stone, torpedo or cigar-shaped, of argillaceous limestone:—

Length ..	...	3 ft. 5 inches.
Circumf. ..	2 „	$6\frac{1}{2}$ „
Weight ...	...	124 lbs.

St. Phillip and St. James' Bay, or "Big Bay," Espiritu Santo.

Fig. 2. Olivine-basalt missile stick, slightly curved:—

Length ..	...	1 ft. $7\frac{1}{4}$ inches.
Section..	...	oval.
Weight	...	3 lbs.

Tanna.

Fig. 3. Coral (*Astræa*) missile stick:—

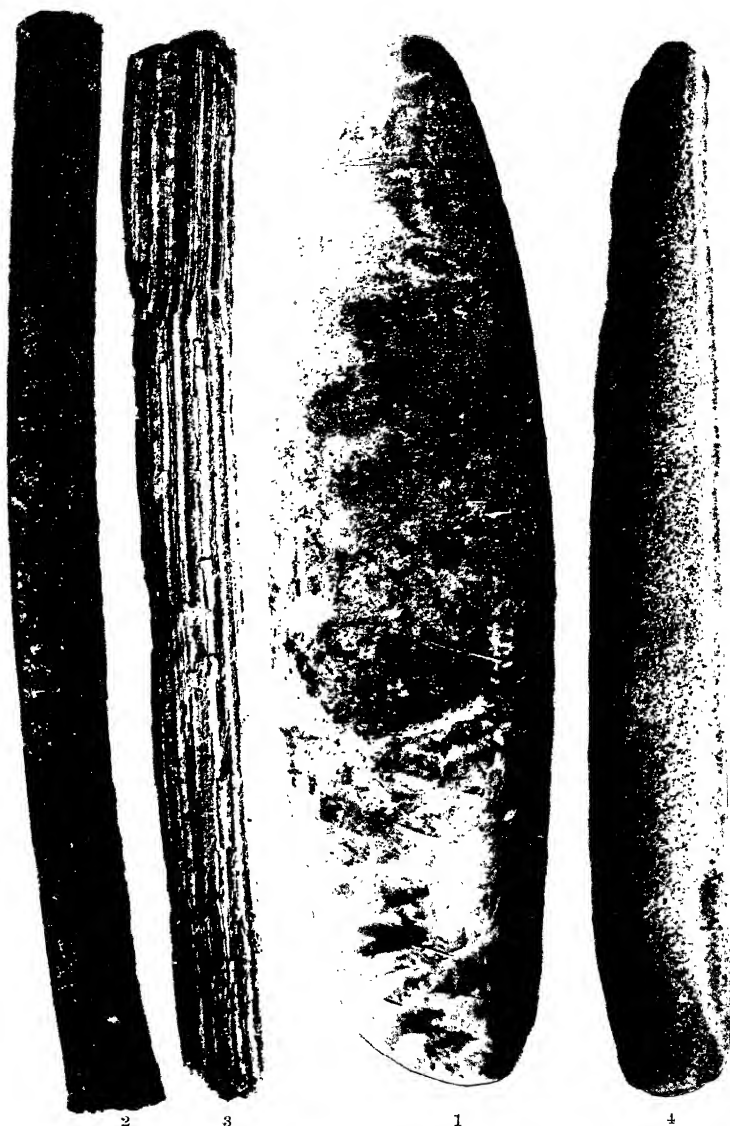
Length...	...	1 ft. 11 inches.
Section...	...	circular.
Weight	...	2 lbs. 11 ozs.

Futuna, or Eronan, Island.

Fig. 4. "Slaying" Stone (*nul-a-mal*), obtusely quadrangular, of olivine-basalt:—

Length ...	..	3 ft. 1 inch.
Circumf. ..	...	1 „ $1\frac{1}{2}$ „
Weight ..	...	45 lbs.

Gwyn-ap Village, Central Tanna.



C. CLUTTON, Austr. Mus., photo.

EXPLANATION OF PLATE XXVIX

Fig 1 Adze-head, lower view

2 „ „ side „

Nassau Island





EDWARD PIERSON RAMSAY, LL D

OBITUARY

EDWARD PIERSON RAMSAY, LL D

Curator, 22nd September, 1874 to 31st December, 1894.

Dr. E. P. Ramsay was the third son of David Ramsay, M.D., the owner of the Dobroyd Estate, Dobroyd Point, Long Cove. He was born at Dobroyd House on 3rd December 1842, and was, therefore, in his 75th year at the time of his death. His education took place at St. Mark's Collegiate School, first at Darling Point and later at Macquarie Fields, presided over by the Rev. G. F. Macarthur, who later became Head Master of The King's School, Parramatta.

In 1863, Mr Ramsay matriculated at the University, and (in the same year) also entered as a student of St. Paul's College. His name remained on the list of members of the University until December, 1865.

In apportioning the Dobroyd Estate amongst the children of Dr. David Ramsay, the large and beautiful garden was allotted to the subject of this notice, and came into his hands about the year 1867. He forthwith opened the Dobroyd New Plant and Seed Nursery on 15th December, 1867, and was engaged in its management until he was appointed Curator of the Australian Museum. On the subject of this Nursery, Mr. J. H. Maiden wrote to me thus:—

“I have before me a ‘Revised List of Novelties’ for 1876, cultivated for sale. . . . This is a creditable catalogue of 46 pages, with an index and a number of illustrations, most of them local products. Some of the plants were claimed to be offered for the first time in the Colonies, and I have no doubt the claim was a perfectly just one. . . . He had, undoubtedly considerable knowledge in regard to the names and propagation of such plants as fell within his purview, and I look upon him as a gentleman amateur of the old days, belonging to the same category as the Macarthurs of Camden, who, like himself, imported plants for the love of the thing, and with the desire to recoup themselves wholly or in part by sales to the Public.”

From boyhood, his interest in everything relating to plants and animals had been intense. His taste was fostered by an under-master at a private school, by Dr. S. R. Pittard (a former Curator), His Excellency Sir William Thomas Denison, The Honbl. A. W. Scott, of Ash Island and Lepidoptera fame, and other scientific friends.

In connection with the said under-master, the Rev. W. H. H. Yarrington has favoured me with the following information:

"I became acquainted with him in 1861 when he visited a German scientific teacher at the Rev. J. Pendrill's School, Glebe Point (where I was a teacher). This gentleman, Herr Reitmann, and Mr. Ramsay were enthusiastic students of Natural Science. . . . He seemed to know something about every department. His enthusiasm was most intense, and what was very remarkable was his wonderfully retentive memory for the names, both generic and specific, especially of ferns."

Mr. Ramsay's entry into scientific life was probably at about the age of twenty, when he became Treasurer of the Entomological Society of New South Wales, at its inception. Just how long he so remained we do not know, but it may be till the Society's demise in 1873,¹ when it practically became linked up with the Linnean Society.

Another notable event in the career of the future Curator was his election as a Life Member of the Royal Society of New South Wales, at its inception in 1865, appearing as such in the list of members printed in the first volume of the Society's "Transactions" for 1868 (1869). He had already communicated a paper, be it noted, to the Royal Society's forerunner, the Philosophical Society of New South Wales—"On the Oology of Australia,"² read on 5th July, 1865, a paper that appears to have escaped the eye of most bibliographers. His election to this old Society took place 7th June, 1865.

The months of August to November, 1866, inclusive, were spent on the Richmond River, no doubt occupied in zoological researches.

¹ Dixon—Presidential Address—*Proc. Linn. Soc. N.S. Wales*, xxix., pt. i., 1904, p. 6.

² Ramsay—*Trans. Phil. Soc. N.S. Wales*, 1862-65 (1866), p. 309.

In 1868, accompanied by a younger brother, Mr. Ramsay visited Queensland to inquire into the sugar-growing industry, and later purchased Sindah Plantation, on the Mary River. In this venture other brothers joined, but like many pioneering undertakings it proved a failure.

Mr. Ramsay was appointed Curator of this Institution at a Special Meeting of Trustees, held on 22nd September, 1874, being proposed by the Honbl. [Sir] W. J. Macleay and [Sir] Alfred Roberts, Esq. His appointment was the means of causing a dispute between the Trustees and the Government of the day, as to the formers' right to appoint their Curator without reference to the latter. Indeed, the Under-Secretary for Justice (the Museum was then affiliated to the Department of Justice) went so far as to say that no salary could be paid to a Curator whose appointment had not been sanctioned by the Government. The Trustees, however, were very soon able, in virtue of their Act of Incorporation, to convince the Under-Secretary that they had the power.

At that time a portion of the Curatorial duties was residence within the building, and here Mr. Ramsay lived with his family until 1888, when the question of space for the accommodation of an increasing staff became a burning one. With the idea of alleviating this pressure the North Wing was dismantled and an extra story added during 1891-2; from this time onward the Curator ceased to reside on the premises.

The Linnean Society of New South Wales came into existence in 1874 through the efforts of a few zealous scientists, conspicuous amongst whom were Dr. H. G. Alleyne, Commander T. Stackhouse, R.N., Sir W. J. Macleay, and Prof. W. J. Stephens, but the actual founders, so Mr. J. J. Fletcher informs me were the two first-named. Whether Mr. Ramsay took an active part, or no, in the preliminary arrangements is not known, "but after the Society started, he certainly was a very active and a very useful member."³ He was one of the Foundation Members, and a Member of the first Council, a position he maintained until his retirement in 1892. He rendered

"most important aid in support of the Society, in furthering its interests during the critical stages of its history. . . .
He was well acquainted with the fauna from his boyhood,

especially with the birds. His early knowledge of it covered a very interesting period, when it had not been anything like so seriously interferred with by settlement as it unfortunately is now."

In association with Sir William he acted as one of the Honorary Secretaries from 1885 to 1890.

During 1880-81 was held the Melbourne International Exhibition which Mr. Ramsay attended as one of the New South Wales Commissioners.⁴

The Museum was awarded the "First Order of Merit" Certificate, equal to a Bronze Medal, for a collection of "stuffed birds and fish"; Ramsay was awarded a "Diploma" in recognition of his services.

In the "Catalogue of Exhibits in the New South Wales Court," etc. printed by the Government Printer here, in 1880, it is remarked:—

"A Collection of food fishes from the waters of Port Jackson and the neighbourhood, exhibited by Mr. Ramsay, Curator of the Australian Museum, should possess a considerable interest. In company with the last-named collection will be found another of the Birds indigenous to the Colony, made by the same gentleman."

This Melbourne Exhibition was simply the successor of the "Sydney International Exhibition" of 1879, better known as the Garden Palace Exhibition. It was opened on 17th September and closed on the 20th April, 1880. At this display Ramsay acted as a Judge in "Classes 604-610, Animal Products, Land and Marine, used as Materials"⁶; for his labours in this capacity he was awarded a bronze medal. In a moment of what was, no doubt, well meant but at the same time the weakest of policy, the Trustees transferred, towards the end of 1879, possibly in September,⁷ the whole of their valuable Ethnological Collection, spoken of in the "Reports of Judges

³ Quotation from a letter from Mr. J. J. Fletcher to the writer.

⁴ Official Record, etc., 1882, p. xxv.

⁵ Official Record, etc., 1882, p. 9.

⁶ Official Record, etc., 1881, pp. cliv. and 707.

⁷ Because it was thrown open on 9th December, Prince of Wales' Birthday (Coombes—Official Report, 1881, p. lxxiv.)

and Awards" as the "finest collection (Ethnological) in the Exhibition,"⁸ and in recognition of its value, a large silver medal was awarded to the Institution.⁹ At the close of the Exhibition this excellent series in common with other valuable collections (Library and Records of the Linnean Society, exhibits destined to form a Technological Museum, Geological collection of the Department of Mines, with records and plans appertaining to other Departments) were left in this jim-crack building, and on the night of 22nd September, 1882, the whole were totally destroyed by fire.

Now this Ethnological series, amassed by Ramsay, with and at great labour and expense,

"with its wonderful variety of Native Weapons, Dresses, Utensils, and Ornaments, and everything that could go to illustrate the Ethnology of Polynesia and Australia stretched along the one side of the eastern transept."¹⁰

All that was left was a photograph and a poor "Official Catalogue,"¹¹ containing no less than 1922 entries.

Nothing daunted by this catastrophe, Ramsay energetically set to work to replace the lost specimens as far as could be done, and so successful were his efforts that it became necessary to add a hall at the south end of the Museum to contain the new gatherings; this was completed during the first half of 1886.

During the regime of Mr. Gerard Krefft as Curator (Dr. Ramsay's predecessor) was commenced under the auspices of the Trustees, the exploration of the caves and rivers of New South Wales. Cave ossiferous explorations were carried on by Krefft—indeed, he appears to have been the instigator of this line of research—from 1866 to 1870, at Wellington, in conjunction with Prof. A. M. Thomson. This excellent work was resumed by Mr. Ramsay at Wellington and other places, and continued throughout 1881-2.¹² The rivers exploration went on for some time longer, and is more fully referred to on page 214.

⁸ Official Record, etc., 1881, p. 284.

⁹ *Ibid.* p. clvii.

¹⁰ Coombes—*Ibid.* p. lxxxvii.

¹¹ Ethnological Gallery. Official Catalogue of the General Ethnological Collection, 1880, pp. 25-48.

¹² Votes of Proceedings, etc., 1882, p. 551.

In 1880 a Royal Commission was appointed

“to enquire into and report upon the actual state and prospect of the Fisheries of this Colony.”

Mr. Ramsay had a seat on the Commission. Shortly after the destruction of the Garden Palace (1882) in which were stored the records of the old Commissioners of Fisheries for New South Wales, Ramsay became a Commissioner, on 31st October, 1882, taking the place of the Honbl. Richard Hill, who had vacated his seat. The Curator remained a member of this body until 21st June, 1895, when he resigned.

On the 13th February, 1883, there appeared in the “Government Gazette” notice of the appointment of the Honbl. [Sir] Saul Samuel as Representative Commissioner, and Mr. Ramsay as Secretary in Charge of Exhibits to the “Great International Fisheries Exhibition,”^{12a} held at South Kensington, London, in 1883. The latter left Sydney on the 3rd March of that year, and in the same month of the following year, 1884, was again at his post in the Museum. During his absence the affairs of the Institution were in the hands of Mr. [Prof.] W. A. Haswell, who had already been attached to the Museum Staff, as Acting-Curator, for a portion of the time, and for the remainder, the Trustees’ Secretary, the late Mr. S. Sinclair, was placed in charge.

Under the division New South Wales, in the “Official Catalogue”¹³ are a few introductory remarks by Mr. Ramsay, wherein he said:—

“The greater portion of the Exhibits in the N.S. Wales Court have been liberally supplied by the Trustees of the Australian Museum at the request of the Commissioners, N.S. Wales Fisheries.”

He was also the author of the “Catalogue of the Exhibits in the New South Wales Court.”¹⁴ These included not only food-fishes, both fresh-water and marine, but also edible Mollusca, Chelonians, Sirenia, and a small general marine Zoological Collection. For the excellence of the specimens, their preservation, and arrangement, no less than six gold, five silver, and one bronze medal were awarded to the Trustees as representing the Museum, and a gold medal to Mr. Ramsay.¹⁵

^{12a} Here it was that the writer first made Dr. Ramsay’s acquaintance.

¹³ 3rd Edit., 1883, p. 176b.

¹⁴ 8vo. London, 1883.

¹⁵ Report Commissioners of Fisheries N.S. Wales to 31st December, 1883, p. 33.

Some years ago the control of Hyde Park passed into the hands of the Municipal Council, but previous to this the Park's affairs had been administered by a Trust, of which Ramsay was a member for many years.

In 1886 the Senate of the University of St. Andrews conferred on Mr. Ramsay the honorary degree of Doctor of Laws.^{15a}

Previous to 1890 the Museum publications went under the general name of "Catalogues," a form that did not give proper scope to the activities of the Staff. At the suggestion of the present writer, Dr. Ramsay proposed to the Trustees to establish a periodical, to appear at irregular intervals, and to be confined to original articles of moderate length emanating from Museum work. The Board

"agreed on the Curator's suggestion to publish periodically reports and papers worked out by the Scientific Staff of the Museum."¹⁶

In 1890 this publication took shape as the "Records of the Australian Museum," the first two volumes appearing in 1890-91 under Ramsay's editorship.

In 1893 the Curator, whose health had been visibly declining for a considerable time previously was absent on extended leave, during which the writer acted as his *locum tenens*; during this period he paid a visit to New Zealand and spent some time in the Rotorua District. For a time the change and rest exerted a very beneficial effect, but ultimately finding the cares of office too strenuous he resigned the Curatorship on the 31st December, 1894. This, however, did not cause Dr. Ramsay's complete severance from the Institution with which he had been connected so long, for he was appointed Consulting Ornithologist, and retained this position until 28th February, 1909, when he finally retired from the service of the Trust.

^{15a} St. Andrew's University Calendar, 1895-96 (1895), p. 118.

¹⁶ Minutes, 6th August, 1889, p. 296.

From a Curatorial point of view, Dr. Ramsay's ideas were for some years certainly on the conservative side. One who knew him well¹⁷ about this time wrote me as follows:—

"I came into Museum matters when they were in a transitional stage, and I remember the old show case heresies,¹⁸ and did do something to put them away. Our friend, however, was quite conservative, and the old wooden show cases, with plenty of wood, often varnished, showing the wood in natural effect (indeed, at one Exhibition the woods of which the cases were made were advertised), the crown and sheet glass, the written labels, and the old methods of mounting and classification quite satisfied him. I remember in the early days how grieved he was at the reforms in Museum technique, which were begun by Haswell and developed to such a notable extent by yourself."

A very marked change, however, was visible as time went on after Dr. Ramsay's return from the Fisheries' Exhibition in methods adopted here.

Where the Curator shone was amongst his birds and bird-skins, the admiration of all Foreign visitors, and these will always stand as a monument to Ramsay's name. During his period of office approximately no less than 17,600 odd skins were added to the National Collection, either by collection, by way of purchase, or as gifts, and the skin-series in particular was always with him an object of great solicitude. The series known as "The Dobroyd Collection," made in their younger days by the Ramsay Brothers, now finds a safe repository here.

He was the author of numerous papers, too many indeed to mention, but a few of the more important will be noticed shortly. Readers interested will find a list of those published in the "Proceedings of the Linnean Society of N.S. Wales" between the years 1875 to 1885 in a supplementary volume of the series;¹⁹ these number one hundred and seven, to say nothing of numerous "Exhibitions." A more complete list can be perused in the three volumes of the "Catalogue of Scientific Papers, compiled by the Royal Society of London," containing the letter R. The list in question gives a total of one hundred and twenty papers, but even this cannot represent a complete record of his writings.

¹⁷ J. H. Maiden.

¹⁸ And so do I; those of the North Wing had been in position since 1856.

¹⁹ List of the Names of Contributors to the First Series (Vols. i.-x.) of the Proceedings of the Linnean Society of New South Wales, from 1875 to 1885 (8vo., Sydney, 1887.)

Among the more interesting mammals described by Dr. Ramsay was *Hypsiprymnodon moschatus*,²⁰ a Rat Kangaroo representing a new genus and species. This was collected by himself in the dense scrubs in the Rockingham Bay District, and though not rare, is still far from plentiful in collections. A Wallaby, *Macropus browni* and a Bandicoot, *Perameles cockerelli* from New Ireland²¹ were named after their discoverers, the Rev. Dr. George Brown and Mr. James Cockerell, while a second Bandicoot, *Perameles broudbenti*,²² was another striking species first made known by him. He also named several other mammals, including Bats, Rodents and Marsupials from Australia, New Guinea, and the Solomon Islands, while he was fortunate in receiving a distinct variety of the Echidna, *Tachyglossus aculeatus* var. *luresi*²³ from Port Moresby. This was forwarded by the Rev. W. G. Lawes, and is differentiated from the mainland form by the greater development of the hair and its particularly narrow skull.

Dr. Ramsay's organisation of a collecting expedition by Messrs. Cairn and R. Grant, to Bellenden Kerr, Queensland, the unexplored home of the then recently discovered Tree Kangaroo (*Dendrolagus*), was the means of greatly enriching the mammalian and ornithological collections of the Australian Museum.

His Herpetological work was less conspicuous, but he described several new Reptiles, including a well-marked variety of the common Death Adder, *Acanthophis praelongus*, from Cape York. His efforts towards the furtherance of Ichthyology were of great importance, not so much on account of his writings as by the establishment of an Ichthyological Collection and his encouragement of contemporary workers. He was in constant communication with Count F. de Castelnau and Sir William John Macleay, both of whom wrote extensively upon Australian fishes, and from whom he acquired many specimens which greatly enriched the Australian Museum collection. His

²⁰ Ramsay—Proc. Linn. New South Wales, i., 1877, p. 33.

²¹ Ramsay—*Ibid.*, pp. 307, 310.

²² Ramsay—*Ibid.*, iii., 1879, p. 402.

²³ Ramsay—*Ibid.*, ii., 1877, p. 32.

official position enabled him to gather together a valuable Ichthyological library, thus enabling these authors to consult works otherwise unavailable to them.

Visiting England in 1883 as Secretary in Charge of Exhibits to the Great International Fisheries Exhibition, Dr. Ramsay met Dr. Francis Day, author of the "Fishes of India," and was able to purchase from him the greater part of the fine collection of Indian fishes upon which this work was based. It included a large number of types and co-types of Day's own species, together with a considerable number of specimens identified by the celebrated Dutch Ichthyologist, Dr. Pieter Bleeker. This invaluable collection was brought safely to Australia and formed the basis of the large Ichthyological Collection since formed in the Australian Museum.

Dr. Ramsay encouraged numerous collectors, both amateur and professional, and the earlier Museum Registers include many entries of zoological collections from all parts of Australasia, gathered together for him by local Missionaries and the officers of vessels trading in the South Seas. In 1882 he organised an expedition to the Burdekin and Mary Rivers, Queensland, with a view to investigating the fishes of that region. This was the outcome of a suggestion of Sir Richard Owen, who thought a search of some of the inter-tropical rivers of Australia might lead to the discovery of living species of archaic types of fishes, similar to *Neoceratodus*. The expedition²⁴ under Mr. Alexander Morton, failed to discover any such types, but a fine collection of the local fauna was obtained, and many species were described as new.

Among the more interesting fishes described as new by Dr. Ramsay, may be mentioned a Ribbon-fish, *Trachipterus jacksonensis*²⁵ and a large Sea Perch, *Lutianus macleayana*.²⁶ He also described and figured a large Sword-fish, *Tetrapturus indicus*²⁷ and some of our larger sharks, which were almost

²⁴ Exploration of the Caves and Rivers of N.S. Wales—Votes and Proceedings, etc., 1882, p. 551.

²⁵ Ramsay—Proc. Linn. Soc. New South Wales, v., 1881, p. 631, pl. xx.

²⁶ Ramsay—*Ibid.*, viii., 1883, p. 178.

²⁷ Ramsay—*Ibid.*, v., 1881, p. 295, pl. viii.

unknown at the time. In 1886, and for a few succeeding years, he collaborated with Mr. J. Douglas Ogilby, who had taken up a position as a Scientific Assistant on the staff of the Australian Museum, but he shortly relegated the whole of the ichthyological work to his colleague.

Between 1863 and 1899 Dr. Ramsay contributed well over one hundred papers on birds to various scientific journals—his principal vehicles of publication being "The Ibis," "Proceedings of the Zoological Society," "Proceedings of the Linnean Society of New South Wales," and the Catalogues issued by the Trustees of the Australian Museum. His initial contributions to ornithological literature appeared in "The Ibis" and included a series of papers on "Notes on the Birds breeding in the neighbourhood of Sydney, New South Wales,"²⁸ and "On the *Didunculus strigirostris*, or Tooth-billed Pigeon from Upolo."²⁹ Besides there appeared a number of occasional papers as well as frequent letters to the then editor of "The Ibis," dealing with numerous points of interest to Ornithologists.

The years 1865 to 1884 saw many papers from his pen, and these appeared chiefly in the "Proceedings of the Zoological Society of London." In these contributions he made known a number of new forms and familiarised workers with the rich bird-fauna of North-eastern Queensland. His papers in the "Proceedings of the Zoological Society" include descriptions of a number of new species, including *Atrichia rufescens* ("Description of a new species *Atrichia* from the Richmond River, New South Wales")³⁰ and *Gliciphila subfasciata* and *Orthonyx spaldingi* ("On Certain New and Rare Species of Birds found at Rockingham Bay, Queensland").³¹ Six years later the descriptions of five new species, *Cypselus terre-regine*, *Delarocelus maculosus*, *Ptilotis frenata*, *Eopsaltia (?) inornata*, and *Rhipidura superciliosa*, were published under the title of "Descriptions of five new species of Birds from Queensland and of the Egg of *Uhlamydodera maculata*."³²

²⁸ Ramsay—The Ibis, v., 1863, p. 177.

²⁹ Ramsay—Ibid., vi., p. 18.

³⁰ Ramsay—Proc. Zool. Soc., 1866, p. 438.

³¹ Ramsay—Ibid., 1868, p. 381.

³² Ramsay—Ibid., 1874, p. 601.

In 1875 he again turned his attention to North-eastern Queensland, and in his "List of Birds met with in North-eastern Queensland, chiefly at Rockingham Bay"³³ he was able to include a new species of *Poecilodryas* (?), *P. cinereifrons*, and a new genus and species *Scenopæus dentirostris*, and two years later added a third new species *Sittella albatu*³⁴ from the same region.

Ramsay's name is also associated with two species of Fly-catchers, *Monarcha (Piezorhynchus) browni*³⁵ from the Solomon Group, and *Rhipidura fallax* from New Guinea.³⁶

The great majority of his papers on Birds, however, appeared in the "Proceedings of the Linnean Society of New South Wales." Here Ramsay published a long list of works extending over a period of eleven years. Of special interest are his "Remarks on a collection of Birds lately received from Fiji, and now forming part of the Macleayan Collection at Elizabeth Bay; with a list of all the species at present known to inhabit the Fiji Islands,"³⁷ and his "Tabular List of all the Australian Birds at present known—showing the distribution of the species,"³⁸ which appeared in the following year, privately published. This list contains the names of 744 species.

The examination and determination of the large collection of Birds obtained in New Guinea during the voyage of the "Chevert" was entrusted to him³⁹ and the results of his researches appeared in the "Proceedings of the Linnean Society of New South Wales" in 1879.

From then on until 1888 Dr. Ramsay described many birds from many widely separated localities; his activities were not confined to the island-continent, but embraced many of the little known spots of the South Pacific.

³³ Ramsay—*Ibid.*, 1875, p. 578.

³⁴ Ramsay—*Ibid.*, 1877, p. 351.

³⁵ Ramsay—*Proc. Zool. Soc.*, 1882, p. 74.

³⁶ Ramsay—*Ibid.*, 1884, p. 580.

³⁷ Ramsay—*Proc. Linn. Soc. N.S. Wales*, i., 1877, p. 69.

³⁸ Ramsay—*Ibid.*, ii., 1878, p. 177.

³⁹ Ramsay—*Ibid.*, iii., 1879, p. 100

In the meantime, he had been engaged on the preparation of a "Catalogue of the Australian Birds in the Australian Museum at Sydney, N.S.W." Part I. of this Catalogue appeared in 1876 and treated of twenty-eight species of Australian Accipitres or Diurnal Birds of Prey. Part II. or "Supplement" to this Catalogue appeared in 1890 and dealt with the sixteen species of Striges or Nocturnal Birds of Prey in the collection of the Australian Museum. The following year (1891) saw the publication of the third part, which was a full account of the Psittaci to that date, and three years (1894) later followed the fourth part which disposed of the Picariæ.

In the preparation of Parts III. and IV., Ramsay expressed his indebtedness to his assistant, Mr. A. J. North, for valuable help.

He was known amongst his intimates as a man of most genial manners, kindness of heart, and possessing a rich vein of humour.

Dr. Ramsay was elected Corresponding Member of the Zoological Society of London in 1866; elected a Fellow of the Linnean Society of London on 18th February, 1875; elected a Member of the Royal Irish Academy, 12th May, 1884. He was also a Fellow of the Royal Society of Edinburgh, and the Geological Society of London. The highest honour acquired by the subject of this notice was that of "Cavaliere" of the Crown of Italy, bestowed on him by His Majesty King Humbert. The precise date is unknown to the writer, but possibly the bestowal took place about the time of his visit to the Naples Zoological Station on the way from London to Sydney at the expiration of the Fisheries Exhibition.*

R. ETHERIDGE, Junr.

* In the preparation of this obviously imperfect notice, I have to express my indebtedness for assistance to Messrs. J. S. Ramsay, J. Ramsay, J. H. Maiden, J. J. Fletcher, H. E. Barff, the Rev. W. H. H. Yarrington, and Messrs. A. R. McCulloch, E. A. Briggs, W. A. Rainbow, and H. S. Grant, of the Australian Museum.

PALÆONTOLOGIA NOVÆ CAMBRIÆ
MERIDIONALIS—OCCASIONAL DESCRIPTIONS OF
NEW SOUTH WALES FOSSILS—No 6¹

By R. ETHERIDGE, JUNR., Curator.

(Plates xl.-xli.)

I—MOUNT WILSON WELL "MUSSELBAND."

(Plate xli., figs. 1-3).

At Mount Wilson, on Dunlop Holding, about thirty miles north-west of Dunlop Homestead, Darling River, a well was sunk previous to 1881, to a depth of about five hundred feet, as a means of water supply. In 1903 I visited the locality and found the surrounding spoil heaps in a great measure composed of a blue calcareous mudstone. This matrix is crammed with broken valves and shell fragments of a small bivalve, so plentiful as to almost form a "musselband," and certainly a good "horizon-indicator" in this portion of our Lower Cretaceous.

When first sunk, water was struck at four hundred and eighty-eight feet in this well in greensand and conglomerate beds.² The strata assigned to the Cretaceous were first met with at a depth of one hundred feet from the surface, consisting of a hard blue clay with shells, pebbles and petrified wood.³ This deposit is no doubt the same as met with in Kapiti Well, No. 2, on Dunlop Holding, about twenty miles west of Mount Wilson, where the "hard blue clay" extended downwards to the three hundred foot level with one slight interruption.⁴

¹ For Nos. 1-5 see Records of the Geological Survey of New South Wales.

² Wilkinson—Ann. R. Dept. Mines N.S. Wales for 1881 (1882), p. 133.

³ Brown—Albert Gold Field—Artesian Water (Report, etc.), *Votes and Proceedings N.S. Wales*, 1881, iii., No. 427-A, p. 725.

⁴ Wilson—Albert Gold Field—Artesian Water (Further Papers) *Votes and Proceedings N.S. Wales*, 1881, No. 448.

The occurrence of fossils in these beds was first reported by Mr. H. Y. L. Brown, the known thickness then being four hundred feet.⁵

The characters of the shell so freely dispersed in this deposit are unfortunately, with two exceptions indefinite. In outline it is transversely oblong, not unlike some compressed *Tellinæ*. The valves were closed and generally compressed, with an apparent absence of anterior and posterior slopes, the anterior ends rounded and the posterior slightly subtruncate. I cannot detect any trace of hinge teeth, and am therefore constrained to regard the shell as edentulous. Both the adductor scars are faint, and appear to be much elongated. The two more definite features, previously referred to, are the rugged exterior, and the papillose nature of the test interior on the sub-umbonal region. The coarse concentric laminæ of the exterior succeed one another with rapidity, but at irregular distances; fragments can at once be recognised by these features.

My inability to refer this shell with certainty to any genus of bivalves occurring in the Queensland Cretaceous System, or in the Australian for the matter of that, is to be regretted because I feel assured that could the "Journal" of the Mount Wilson Well boring be consulted this mollusc would be found to indicate, or mark, an horizon, just as readily and emphatically as does an equally obscure little bivalve I described from southern Queensland as *Pachydomella chutus*,⁶ and for a similar purpose.

As a matter of fact, I can see very little difference, with the limited information at my disposal, between the present bivalve and that just referred to, with the exception of that of outline and size. As *P. chutus* was coined in a great measure as an aid to the field surveyor, so in this instance I suggest the name of *P. ? piesta*.⁷

⁵ Brown—*Loc. cit.*, p. 725.

⁶ Etheridge—*Rec. Austr. Mus.*, vi, No. 5, 1907, p. 325, pl. lxii., figs. 4-8.

⁷ πιεστος—that which is pressed.

II.—AN ADDITIONAL ANNELID JAW FROM THE UPPER SILURIAN OF BOWNING.

(Plate xli., fig. 4).

A particularly interesting Annelid jaw was entrusted to me by Mr. John Mitchell, from the rich fossiliferous beds of Bowning. It is quite distinct from any of those hitherto described from Australian strata, and adds a further genus of Errant Annelids to the Australian list.

In 1879 Dr. G. H. Hinde proposed the genus *Staurocephalites* for "jaws of more or less elongated, compressed, denticulate plates, resembling those of the existing genus *Staurocephalus*, Grube."⁸ Dr. Hinde's likened-name is particularly unfortunate because *Staurocephalus*, Grube, 1853, was antedated as a genus of Trilobites by Barrande at least nine years before, in 1846. However, there the name is, and as *Staurocephalites* must be used.

The little jaws for which Dr. Hinde proposed this name are ribbon-like, and may be best compared to a fret-saw blade.

The two Bowning jaw-plates are linear, long, flattened, narrow, particularly delicate and black in colour, both about six millimetres in length. The slightly longer of the two has about twenty-six teeth, the shorter about twenty-two. These teeth are exceedingly minute, acicular, separate from one another, not inclined, but at right angles to the ribbon itself, and of uniform size; the height varies from 0.21-0.27 mm.

These minute objects are quite distinct from both of Hinde's species, *S. niagarensis*⁹ and *S. serrula*,¹⁰ in that they are (if perfect) uniformly linear, and no evidence of narrowing from before backwards. They are also acicular-toothed instead of triangular as in *S. niagarensis*, or short and rounded like those of *S. serrula*.

It is proposed to term this form *Staurocephalites grammoides*.¹¹

⁸ Hinde—Quart. Jour. Geol. Soc., xxxv., 1879, p. 383.

⁹ Hinde—*Loc. cit.*, xxxv., 1879, p. 383, pl. xx., fig. 1.

¹⁰ Hinde—*Loc. cit.*, xxxvi., 1880, p. 376, pl. xiv., figs. 18-20.

¹¹ γράμμη—a line.

III.—PELECYPODA FROM THE PERMO-CARBONIFEROUS OF
BUNDANOON.*Genus* Diaphragmella,¹² *gen. nov.*

Gen. Chars.—Shell elongately pteriniform, left valve convex; cardinal margin provided with ligamental furrows, and a few cardinal teeth, but no lateral lamellæ; clavicle oblique, inconspicuous; adductor scar very small, but deep, high in position.

Obs.—A remarkable form with the outward appearance of an oblique *Merismopteria*, but with a small oblique clavicle in front of the anterior adductor scar in the place of a strong one at right angles to the cardinal margin. There is an excavate ligamental area as in *Merismopteria*, but no diverging lateral lamellæ; there are one or two cardinal teeth slightly anterior to the umbos, which do not exist in *Merismopteria*, situated above the highly placed anterior adductor, quite on a par with the structure of *Pterinea*, but again is to be noted the absence of lateral dental lamellæ. On the other hand, there is a resemblance to *Pterinea* in the convexity of the left valve, and were the test preserved, strong radiating costæ.

Diaphragmella merismopteroides, sp. nov.

(Plate xl., figs. 1-2).

Sp. Chars.—Shell (cast) elongately and obliquely pteriniform; cardinal margin less than the width of the shell; ventral margin well rounded; anterior end proper very small and lobe-like, the margin strongly insinuate downwards; posterior auriculation flattened. Umbonal region long, narrow, convex and elevated, the umbo apparently slender and acute; cardinal teeth very slightly in advance of the umbo. Anterior adductor scar immediately under the cardinal margin, placed obliquely.

Obs.—This appears to be a remarkable modification of the *Merismopteria* type, and might easily be mistaken for the latter on casual observation.

¹² Diminutive of *διαφραγμα*, a partition.

(Genus *Modiomorpha*, J. Hall and Whitfield, 1869.

(Prelim. Notice Lamellibranch Shells, 1869, p. 72).

Obs.—This is chiefly a Devonian genus, but occurs to a slight extent in the American Carboniferous. Mr. F. Chapman has recognised it amongst Silurian fossils in Victoria,¹³ and if our respective determinations prove correct, the range of the genus in time is much extended.

Modiomorpha mytiliformis, *Eth. fil.*

(Plate xl., fig 3).

M. mytiliformis, *Eth. fil.*, Geol. Pal. Q'land, 1892, p. 273,¹⁴ pl. 14, fig. 5, pl. 38, figs. 12 and 13 (*non* pl. 41, fig 4).

Obs.—I believe this to be the *M. mytiliformis* of the Middle Bowen Series of Queensland, and if so, strengthens the separation already made from both the smaller figures of McCoy's *Modiola crassissima* and *M. (Cypricardia) imbricata*, Dana.

All I can differentiate between the specimen and my quoted figures is that the anterior margin in the former is even straighter than in the latter.

The concentrically ribbed anterior adductor scar is visible.

(Genus *Glyptodesma*, J. Hall, 1883.

(Pal. New York, v., pt. i., Plates and Explanations, 1883).

Glyptodesma (?) *bundanoonensis*, *sp. nov.*

(Plate xl., figs. 4 and 5).

Sp. Churs.—Shell (left valve cast) large, sub-quadrangular, slightly oblique; cardinal margin straight, the ventral

¹³ Chapman—Proc. R. Soc. Vict., xxi. (N.S.), pt. i., 1908, p. 224.

¹⁴ In describing this species on page 273, I committed an error in the twenty-fourth line by using the word "latter," which should have read "former." The corrected sentence will, therefore, be:—"This shell is very like the smaller figure of McCoy's *Modiola crassissima*, but not the larger one, and may even be the former."

gradually rounded. Anterior end very small and lobe-like, the margin proceeding therefrom practically straight, rounding below into the ventral; anterior slope nearly vertical. Posterior end constituting nine-tenths of the entire valve, divisible into the body and wing; the former in the umbonal region, is high, prominent, narrow above, gradually expanding and becoming flattened downwards; the latter is large, flat transversely, but gently convex in sections from above downwards. Umbo (defective) apparently acuminate, inclined forward and projecting above the dorsal margin. Ligamental area very finely grooved; lower lateral tooth extends from just posterior to the umbo half way to the posterior margin, the superior commences at about half the length of the lower, terminating at the same point. Adductor scar longitudinally oval, situated partly on the posterior wing and partly on the umbonal slope; sculpture unknown.

Obs.—These imperfect casts indicate a form quite new to our Permo-Carboniferous fauna, and for which we have no receptive genus. With one exceptional feature they accord better with the characters of Hall's *Glyptodesma*, although a Devonian genus, than with those of any other known to me.

Like *Glyptodesma*, this Bundanoon fossil is aviculo-pterini-form, with a small auricular anterior end, a finely and continuously grooved ligamental area, two oblique lateral hinge teeth, a well-marked anterior adductor scar, and pallial muscle insertion pits. On the other hand our specimens lack the "irregular transverse plications along the cardinal margin," hence a note of interrogation after the generic name.

Genus Paracyclas, J. Hall, 1843.

(Geol. New York, pt. iv., 4th District, 1843, p. 171).

Obs.—*Paracyclas* has hitherto been regarded as a Devonian genus, but the elegant little shells (Pl. xl., figs. 6 and 7) so entirely conform to the characters of many species of *Paracyclas*, that I am constrained to use it for our Permo-Carboniferous species rather than propose a new name for what, after all, may turn out to be allied to one or other of the chaotic genera of Dana, McCoy or De Koninck.

Paracyclas (?) *obliqua*, *sp. nov.*

(Plate xl., figs. 6 and 7).

Sp. Chars.—Shell broadly elliptical, slightly oblique to the posterior; length considerably exceeding the breadth; valves equally convex, inclined to gibbosity in the centres. Cardinal margins less than the width of the shell, faintly arched; anterior, posterior, and ventral margins rounded; anterior and posterior slopes ill-defined; ligamental grooves (one in each valve) rather faintly marked and shallow. Concentric costæ remarkably regular, and in testiferous examples must have been prominent and strong, with traces of interlineations.

Obs.—The obliquity to the posterior distinguishes this from most of the American species. An Australian ally may be found in De Koninck's *Scaldia* (?) *lamellifera*,¹⁵ but our little shell is certainly not a *Scaldia*.

Genus [*Allorisma*], *King*, 1844 and 1850.

(*Annals Mag. Nat. Hist.*, xiv., 1844, p. 315; *Mon. Permian Foss. England*, 1850, p. 196).

In 1844, Prof. W. King proposed his *Allorisma* without naming a type, as a genus of *Pholadomyidæ*, both valves being furnished with a cartilage fulcrum elongated in the direction of the cardinal line; also described as edentulous, and the pallial line indistinct.

In the second definition published in 1850, the valves were said to articulate "by means (only) of an external cartilage," and the pallial sinus deep or shallow; *Hiattella sulcata*, Fleming, was named as the type species.

Without entering into a mass of historical detail, it is sufficient to point out that King's definitions are diametrically opposed to one another. An author cannot be allowed to play fast and loose, even with genera of his own proposing, without endless confusion arising, and such confusion has arisen, for no two authors use the name *Allorisma* in the same sense, one employs it in the sense of 1844, another in that of 1850.

McCoy claimed¹⁶ that, as originally defined *Allorisma* was, in part at least, the equivalent of his *Sanguinolites*; probably so, but those species included in the second definition of the

¹⁵ De Koninck—*Foss. Pal. Nouv. Galles du Sud*, pt. 3, 1877, pl. xv., fig. 7.

¹⁶ McCoy—*Brit. Pal. Foss.*, fas. ii, 1852, p. 276.

former are certainly not. Indeed *Sanguinolites* of 1844¹⁷ appears to have included a heterogeneous assortment of forms, and is in some respects a synonym of *Edmondia*, De Koninck, 1842.

From 1844 to the present time, there has been a constant juggling with the name *Allorisma*, or *Allerisma*, as some spell it, and it is time it made way for a new name properly defined. One of the latest American writers, Mr. G. H. Girty uses¹⁸ the genus as of 1844, and even the careful and astute Waagen employed¹⁹ the name in an ill-defined sense, doubtful whether his species conformed to one or the other definition, although he does not say so in so many words. Even Mr. J. G. Goodchild's amended description²⁰ does not in every way suffice. This appears to be based on King's definition of 1850, and might have been used had Mr. Goodchild proposed a *nomen nudum* and named a type species.

[*Allorisma*] *passaloides*,²¹ *sp. nov.*

(Plate xl, fig. 8).

Sp. Chars.—Shell (cast) transversely oblong, very inequilateral; valves sub-compressed; cardinal margins long posteriorly, slightly arched; ventral margins straight medianally; anterior ends small but projecting, their margins sharply rounded, in all probability a shallow lunule present; posterior extended, end inclined to be nasute; diagonal ridge rounded and inconspicuous; posterior slope flattened. Exterior with concentric costæ, which were particularly strong on the anterior end and anterior-ventral portions of the valves.

Obs.—The ligament must have been wholly external, as there is no trace of any mechanism along the cardinal margins for its attachment. One other described shell, *Sanguinolites tenesoni*, De Koninck, is possibly congeneric with [*Allorisma*] *passaloides*; in the former the anterior end is much larger and the cardinal margin quite straight.

¹⁷ McCoy—Synop. Carb. Lime Foss. Ireland, 1844, p. 47.

¹⁸ Girty—Carboniferous Formation and Faunas of Colorado (*U.S. Geol. Survey Prof. Papers*, No. 16, Series C, 1903), p. 437.

¹⁹ Waagen—Salt Range Foss. (Pal. Ind.), i., pt. iii., 1881, p. 192.

²⁰ Goodchild—Proc. R. Phys. Soc. Edinb., xi., pt. 2, 1893, p. 245.

²¹ *πάσσαλος*—a peg.

EXPLANATION OF PLATE XL.

Diaphragmella merismopteroides, *Eth. fil.*

- Fig 1. Cast of left valve displaying impression of the oblique clavicle, anterior adductor, and external radii.—x 2 diam.
- Fig 2. Umbonal region and imperfect cardinal margin, with impression of the clavicle and teeth—x $2\frac{1}{2}$ diam.

Modiomorpha mytiliformis, *Eth. fil.*

- Fig. 3. Internal cast of incomplete left valve.—x $1\frac{1}{4}$ diam

Glyptodesma (?) *bundanoonensis*, *Eth. fil.*

- Fig. 4. Internal cast of incomplete left valve, showing the insignificant anterior end, high prominent umbonal region, expanded posterior end, and ligamental furrows, etc.
- Fig. 5. A similar specimen, with traces of the large adductor scar.

Paracyclas (?) *obliqua*, *Eth. fil.*

- Fig. 6. Internal cast of a left valve, displaying the groove left along the posterior cardinal margin for the support of the internal ligament.—x 2 diam.
- Fig. 7. A similar right valve.—x 2 diam.

[*Allorisma*] *passaloides*, *Eth. fil.*

- Fig. 8. Internal cast of a right valve, faintly displaying position of the posterior adductor, and the external concentric laminæ.—x $\frac{1}{3}$ diam.



EXPLANATION OF PLATE XLI.

Pachydomella (?) *piesta*, *Eth. fil.*

Fig. 1. Portion of the fossiliferous shell, or "musselband."

Figs. 2 and 3. Imperfect examples extracted from the general mass as seen in Fig. 1.

Staurocephalites grammoides, *Eth. fil.*

Fig. 4 Two jaw plates, both about six millimetres in length.





SUTHERLAND SINCLAIR
FROM A COMPARATIVELY RECENT PORTRAIT.

OBITUARY.

SUTHERLAND SINCLAIR.

Secretary, September, 1882 to May, 1917.

Mr. Sutherland Sinclair was the eldest son of the Rev. Sutherland Sinclair, of Greenock, Scotland, where the subject of this notice was born on 25th October, 1851. He was educated at the Greenock Academy, and after leaving school in 1866 was engaged in mercantile pursuits in Glasgow.

In November, 1870, Mr. Sinclair voyaged to Pensacola, in Florida, returning the next year.

Only a few are aware how extensively travelled a man Mr. Sinclair was. In November, 1871, he left the Clyde in the ship "Tamerlane" bound for Sydney, arriving on 15th February, 1872. In his itinerary he records as one of his first visits as that to the Australian Museum, which he describes as a large building "with some pretensions to architectural beauty."

It was evidently in his mind to obtain employment in Sydney, but failing to acquire a satisfactory position he stuck to the "Tamerlane," which next proceeded to Shanghai, coal laden, leaving here on 12th March, 1872, and arrived at the Chinese port in the following May. Thence in June to Kobe, Japan, in ballast, via Osaka in the same month, reaching Kobe on 30th June. In the following month the vessel was at Hong Kong and Amoy Island. The final stage but one of his voyage was now entered on for the "Tamerlane" left Eastern waters in September for New York, rice laden, by the Cape of Good Hope route. In the Atlantic St. Helena was touched at in December, 1872, and Sinclair duly availed himself of the opportunity to visit Longwood, and the site of Napoleon's tomb. New York was reached on 3rd February, 1873, and on the eighteenth of the same month the vessel started on the return "home." The Tail of the Bank was reached on 19th March, 1873, so bringing this long voyage to a close.

On his return to Scotland he again entered into business employment, and in September was elected Superintendent of the Govan United Presbyterian Church Sabbath School at the early age of twenty-six. His second voyage to Sydney appears to have been taken chiefly for health reasons. He left Liverpool in April, 1879, in the ship "Gryfe" accompanied by a brother, Mr. T. C. Sinclair. They arrived in July of the same year, and Mr. S. Sinclair again took up mercantile pursuits, until his attention was called to the vacant position of Secretary to the Trustees of the Australian Museum. As the successful candidate he was appointed on the 8th September, 1882,¹ and on 6th October, 1891, also undertook the duties of Librarian and Storekeeper.²

In July, 1885, Mr. Sinclair was granted leave of absence to visit Great Britain, and it was during this visit that the writer had the pleasure of making his acquaintance.

In April and May, 1894, the Secretary visited Erromanga, New Hebrides, as the guest of his close friend, the Rev. Dr. H. A. Robertson of that island, when he succeeded in obtaining some valuable Ethnological specimens; during his absence the writer acted as his *locum tenens*.

In March, 1906, sudden and severe illness overtook him, and in consequence a rather extended absence from official duties became necessary.

Mr. Sinclair was pre-eminently a philanthropist—the one object of his life was to advance the wellbeing of his fellow men, regardless of creed or social position. In the prosecution of this self-denying object, he, in 1880, accepted the Superintendentship of the St. Peters Presbyterian Sabbath School, North Sydney. Whilst so engaged he became interested in the Children's Ministering League, and was also the first to originate the Boys' Brigade in New South Wales, in 1896; in 1905 was formed the "1st Sydney Company" as inaugurated.

¹ Minutes, 8th Sept., 1882, p. 414.

² *Ibid.*, 6th Oct., 1891, p. 70.

with Sinclair as "Captain," and the Rev. James Kinghorn, Minister of St. Peters, as "Chaplain." This organisation must not be mistaken for either the Church, or Paper Boys' Brigades, philanthropic bodies of a like nature, but distinct. Mr. Sinclair resigned his official position in the Sunday School in July, 1906, after from twenty-six to twenty-seven years close and efficient control, but ever after retained his interest therein.

In 1883, Sinclair became Honorary Secretary of the Young Peoples' Scripture Union of Australasia, a step which accorded well with the predilection and affection always manifested by him towards the young. Another of Mr. Sinclair's benevolent activities were the operations of the Sydney City Mission, of which he became a Member of Council in June, 1911. In April, 1912, he was elected to a seat on the Committee of the Bible Society, which he had joined in 1910.

Mr. Sinclair always manifested great interest in Missionary work, particularly the labours of the Presbyterian Church in the New Hebrides, associating himself chiefly with his friend, the Rev. Dr. H. A. Robertson. His participation in and predilection for the New Hebridean Mission were also the means of adding many valuable specimens to the Museum Collection.

One of the great objects of his life was the education of the blind, both morally, physically, and industrially. In this great cause he became the Hon. Assistant Secretary to the Committee of the Sydney Industrial Blind Institution, Boomerang Street, in 1884, a Member of the Committee in 1886, and Hon. Secretary in 1887, succeeding Mr. John Dawson, who became Treasurer³; he was thus officially connected with this meritorious institution for upwards of thirty-three years.

A gentle, sincere, unostentatious, upright, truly religious man and gentleman was Sutherland Sinclair, one whom any person might have been proud to call friend. He died after protracted illness on 3rd May last in the sixty-sixth year of his age.⁴

³ Sydney Industrial Blind Institution. Illustrated Souvenir, 1879-1910 (oblong, Sydney, n.d.)

⁴ For many of the facts in this brief notice I am indebted to Dr. Eric Sinclair, Inspector-General of the Insane, New South Wales, who afforded me access to some of Mr. Sinclair's private memoranda.

In connection with the Australian Museum, Mr. Sinclair was the author of the following publications :—

- 1.—Guide to the Contents of the Australian Museum, pp. 146, plan, etc. (8vo. Sydney, 1890).
- 2.—Notes of a visit to the Island of Erromanga, New Hebrides in May, 1894. *Proc. Linn. Soc. N.S. Wales*, ix. (2), 1895, pp. 701-7.
- 3.—The Australian Museum Library. *Trans. and Proc. Second Internat. Library Conference* for 1897 (1898), pp. 207-8.
- 4.—The Australian Museum. *Proc. Museums Assoc. 9th Ann. Meeting for 1898* (1899), pp. 151-5.
- 5.—List of Publications issued by Authority of the Trustees of the Australian Museum.⁵ *Austr. Mus. Miscellaneous Publications*, x., pp. 67 (8vo. Sydney, 1916).

R. ETHERIDGE, Junr.

With the co-operation of Mr. W. A. Rainbow, Assistant Librarian.

STUDIES IN AUSTRALIAN CRUSTACEA.

No. 4. *

By ALLAN R. McCULLOCH, Zoologist, Australian Museum.

(Plates xlii-xliii.)

AUSTRALIAN FRESH-WATER CRABS.

(Plate xlii.)

The identification of the several species of Fresh-water Crabs occurring in Australia is a matter of considerable difficulty. This is partly due to the fact that references to them in literature are both scanty and incomplete, but a greater difficulty is presented by the remarkable degree of variation which they exhibit in characters which are recognised as constant in marine species.

The extraordinary uniformity of climatic and other conditions prevailing over a large portion of Australia, combined with a close intermingling of the river systems, has enabled many of our fresh-water animals to distribute themselves over an exceedingly wide area. Some fishes¹ for example, are known to range from the western waters of New South Wales to Central, North, and Western Australia; though they present remarkable variations in both form and colour-marking, they cannot be subdivided even into geographical subspecies, as is readily proved by a large series of specimens collected from various widely separated localities. Similarly, the Yabbie, *Parachærapa bicarinatus*², ranges from Victoria to Queensland, Central and North Australia, and perhaps reaches the Western State, but though it exhibits marked variation in all parts of its range, it nevertheless appears indivisible into subspecies. Though more restricted in their distribution, the Fresh-water Crabs of Australia appear to be equally variable, and in the absence of ample material from numerous localities, it seems to be impossible to determine the true relationship of the different forms to one another.

* For No. 3 see Vol. ix., p. 321.

¹ Ogilby and McCulloch—Mem. Qld. Mus., v., 1916, pp. 101, 106, 110.

² Smith—Proc. Zool. Soc., 1912, pp. 147, 163.

Five names have been bestowed upon Australian specimens, all of which were obtained in Queensland, four being from Cape York. *Thelphusa transversa*, Von Martens³, and *T. crassa*, A. M. Edwards⁴, were described almost simultaneously, and are considered synonymous by De Man⁵. *T. leichardti*, Miers⁶, an insufficiently characterised species, is perhaps merely a variety of *T. transversa*. The other species *T. angustifrons*, A. M. Edwards⁷, and *T. planifrons*, Bürger⁸, are better characterised, and may be distinguished by the following key:—

- a. Lateral margins of front parallel; fronto-orbital breadth equal to the length of the cephalothorax; penultimate leg twice as long as the cephalothorax.....*planifrons*.
- aa. Lateral margins of front divergent backwards; fronto-orbital breadth less than the length of the cephalothorax; penultimate leg much less than twice as long as the cephalothorax.
- b. Pronounced postfrontal elevations extending between the epibranchial teeth; branchial regions markedly rugose both anteriorly and posteriorly.....*angustifrons*.
- bb. Postfrontal elevations obsolete or absent; branchial regions almost or quite smooth anteriorly.....*transversa* and *leichardti*.

(*THELPHUSA LEICHARDTI*, Miers.

(Plate xlii., figs. 1-4.)

Thelphusa leichardti Miers, Zool. Alert, 1884, p. 236.

Adult male (from twenty miles west of Hughenden, North Queensland.)

Cephalothorax smooth, punctate; the punctations close and coarse on the gastric regions, finer and less numerous elsewhere. The carapace is very convex longitudinally; the middle part of the back is flat transversely, but the swollen branchial regions make it very convex laterally. Cervical

³ Von Martens—Monatsh. Ak. Wiss. Berlin, 1868, p. 609.

⁴ A. Milne Edwards—Nouv. Arch. Mus. Paris, v., 1869, p. 177, pl. ix., fig. 2.

⁵ De Man—Notes Leyd. Mus., xiv., 1892, p. 241.

⁶ Miers—Zool. Alert, 1884, p. 236.

⁷ A. Milne Edwards—Nouv. Arch. Mus. Paris, v., 1869, p. 171, pl. viii., fig. 1.

⁸ Bürger—Zool. Jahrb., Syst., viii., 1894, p. 6, pl. i., fig. 6.

groove incomplete and forming a very shallow depression on each side, but the H-shaped grooves defining the gastro-cardiac regions are more distinct. No postfrontal prominences, though a minute median furrow is present. The length of the cephalothorax is 1.4 in its breadth.

Front, orbital borders, and anterolateral margins raised into a low ridge. Front deflexed, its anterior margin slightly concave, its width 4.4 in the breadth of the carapace; its anterior face is deflexed downward and backward to meet the epistome. Outer frontal angles rounded and continuous with the orbital borders. Orbits slightly oblique, wider than deep, the margins entire without sutures; the lower margin is microscopically milled and forms a cristate tubercle internally, and the exterior angle is not tooth-like.

Lateral margins of carapace arcuate, defined anteriorly by a low, smooth crest; a minute notch a short distance behind the eye on each side forms an epibranchial tooth. Posterolateral margins ill-defined, slightly oblique, and longer than the anterolateral; they are marked with fine wrinkles which pass forward and downward to the sides of the carapace. Pterygostomial and subhepatic regions somewhat rugose with scattered ridges and wrinkles.

Abdomen consisting of seven movable segments. The first is rounded anteriorly, with concave sides; its width is one-sixth greater than its length. The second is wider than long, its sides almost parallel, slightly convergent anteriorly. The fifth, fourth, and third joints become uniformly wider, while the second and first are as wide as the fifth. Sternum and abdomen with scattered punctations. Two broad and deep furrows are present on the anterior part of the sternum between the last abdominal segment and the base of the maxillipeds.

Basal antennal joint in contact with the under surface of the fronto-orbital angle, the flagellum about two-thirds as long as the eye. Epistome broad, with a broad rounded depression on its median portion, which forms an angular lobe between the maxillipeds. Outer maxillipeds smooth, punctate; the ischium is subquadrangular, much longer than broad, with a slightly oblique groove much nearer the inner than the outer

border; the merus is much broader than long, with its outer margins rounded, the inner truncate; it is pointed anteriorly, with its antero-internal angle somewhat excavate.

Chelipeds very unequal but of similar construction. The upper margin of the merus is rugose, and terminates in an obtuse tubercle; the other margins are smooth. Carpus punctate; with two inner spines, the antero-superior of which is the larger. Hand smooth, without sharp angles; fingers of the larger hand are widely gaping, meeting only at their tips, and are denticulate along their whole inner margins; the upper has two groups of enlarged teeth, one near the base and the other near the middle, while the lower has a very large tooth between the two upper ones, and one in advance of it. In the smaller hand the fingers meet along almost their whole length; the denticulations are subequal, but some are somewhat enlarged as in the larger hand.

Meral joints of the ambulatory legs compressed, with three ridges, one above and two below; in the first three pairs the upper portion of the basal half is rugose, but in the fourth pair it is smooth. Carpal joints of the first three pairs with one superior and two lateral ridges, the two latter terminating in minute spines; in the fourth pair the two lateral ridges are obsolete. Propodus of each pair with several larger and smaller spines on its upper and lower ridges, and one at the termination of each. Tarsi with strong spines on each of the four upper and lower angles.

Breadth of carapace 44mm.; length of carapace 31mm.; fronto-orbital width 25mm.; breadth of front 10mm.

Female.—A female 38mm. wide, which was collected with the male, differs in having the hands subequal in size and of the same shape as the smaller hand of the male. The branchial regions are less inflated so that the carapace is flatter from side to side, and the cervical grooves are much less evident. The abdomen completely covers the sternum, and is widest between the fourth and fifth segments; its sides are arcuate, narrowing evenly forwards to the obtusely angular tips. In all other details the female appears similar to the male.

Nomenclature.—In identifying these specimens as *T. leichardti*, I am guided rather by a consideration of the locality whence that species was obtained than by the meagre characters referred to by Miers. He had two examples from different sources, the localities of which he gave merely as East Australia, but according to the notes of the late Mr. F. E. Grant, he examined a specimen in the British Museum which was labelled "*Telphusa leichardti*, sp. nov., E. Australia, Lat. 27° 9', Long. 144°." This position is in South-western Queensland, and is well within the area over which the species described above ranges. As already stated, however, I think it probable that *T. leichardti* is not distinct from *T. transversa*, the types of which were obtained at Cape York.

Variation.—The Australian Museum collection includes nineteen examples from different localities which appear to be specifically identical, though they exhibit considerable variation in several structural details. The *fronto-orbital width* ranges from 1.9-1.7 in the width of the cephalothorax; that this is merely individual variation is proved by the fact that it differs in individuals which have been collected together, while a series of specimens shows an unbroken range of intermediate stages. The *convexity of the back* is evidently a very variable character. Notwithstanding the very different appearance of markedly convex examples from New South Wales, and others much flatter from King Sound, North West Australia, an intermediate series seems to preclude the possibility of the two being distinct species or even subspecies. On the other hand, four from North-eastern Queensland, in which the carapace is particularly flat, may be conveniently separated as a distinct variety under the name *plana*. The width of the *abdomen* in both sexes is variable; the form of the male abdomen is shown in my figure, but the proportions of the component segments, and particularly of the last three, are somewhat variable; the female abdomen may entirely cover the sternum, or leave a portion exposed on either side. The *rugosity* of the legs varies somewhat in different specimens, as do the fine lines on the sides of the carapace, but to a less degree than the other features noted.

Locs.—The two specimens described in detail were collected by Mr. F. L. Berney twenty miles west of Hughenden, North Queensland, where the species is quite common, occurring in

every stream and waterhole around the district. It digs burrows in the wet mud of the banks, piling up a small crater of soil at their mouths a couple of inches high. The other specimens which I identify as this species were obtained at the following localities:—

- (3)—Dandaloo, Bogan River, Central New South Wales.
- (3)—Moree, Gwydir River, Northern New South Wales.
- (2)—Forty miles North-west of Collarenebri, Northern New South Wales.
- (2)—Angeldool, Narran River, Northern New South Wales.
- (1)—Port Darwin, North Australia.
- (6)—King Sound, North West Australia.
- (2)—Locality ?

GEOTHELPHUSA LEICHARDTI, VAR. *PLANA*, *nov. nov.*

(Plate xlii., fig 5.)

Four examples from North-east Queensland are very different in general appearance to those I have identified as *G. leichardti*, but I am unable to discover any important structural differences to distinguish them. The carapace is much flatter both transversely and longitudinally than in *G. leichardti*, and the chord of the antero-lateral borders is relatively shorter; the cervical and gastro-cardiac grooves are somewhat more deeply impressed, and the former diverge more widely than in *G. leichardti*; the postfrontal prominences are very weakly indicated; the male abdomen is narrower than is usual in *G. leichardti*, the greatest breadth of the third segment being only equal to the combined lengths of the last two. Apart from these features however, I can find no definite character by which this form may be recognised.

Measurements of the male specimen figured. Length of carapace 23mm.; breadth of carapace $30\frac{1}{2}$ mm.; fronto-orbital width 19mm.; breadth of front $7\frac{1}{2}$ mm.

Lvs.—(2) Eureka Creek, Walsh River, North-east Queensland (flowing into the Gulf of Carpentaria.)

(2)—Cooktown, North-east Queensland.

Notes on Variation in *ASTACOPSIS SERRATUS*, Shaw.

(Plate xliii.)

The common Crayfish or Fresh-water Lobster of Eastern and Southern New South Wales and Victoria undergoes considerable alteration in its armature and ornamentation during transition from the young to the adult stages. It is also subject to considerable variation at all ages, but particularly when about 100mm. long, at which size it begins to develop the large tubercles and spines which are characteristic of full-grown specimens.

The species is represented in the Australian Museum collection by a fine series of over seventy specimens from various parts of New South Wales, which are well graduated in size. The smallest specimens, 45mm. long (measured from the end of the rostrum to that of the telson), have the carapace nearly smooth, but it gradually becomes granular as they increase in size until a length of about 95mm. is attained, when larger tubercles and spines begin to make their appearance. Twenty full-grown examples, 160-260mm. long, are the typical *A. serratus* as figured by Shaw¹, with large spines or tubercles on the posterior half of the carapace, and numerous stout spines on the abdomen.

Some examples of intermediate size, measuring up to 132mm. in length, have not developed the armature characteristic of the adult stages, but have the hinder portion of the carapace granular and the abdomen without spines as is typical of younger specimens; the lateral edges of the rostrum also are nearly smooth instead of strongly dentate as usual. These belong to the variety described and figured by Dana as *A. nobilis*², but they do not appear to attain a large size, and perhaps develop into the typical form with increased age. Still others from near Stanthorpe, Southern Queensland, have the general characters of the variety *nobilis* but have the rostrum very large and broader than is usual in the species.

¹ Shaw—Zool. N. Holland, 1794, p. 21, pl. viii.

² Dana—Wilkes U.S. Explor. Exped., Crust., i., 1852, p. 526. pl. xxxiii., fig. 3.

Twelve specimens, 62-82mm. long, differ from all others in the collection in having the whole carapace, abdomen, and appendages markedly hirsute, while the rostrum is narrower than is usual, though a careful comparison with others of the typical form and of similar size fails to reveal any further characters to distinguish them. They were obtained in the Belmore Falls Creek, which runs into the Kangaroo River, New South Wales, and were presented to the Australian Museum by Professor W. A. Haswell, F.R.S. He discovered a new commensal worm, *Temnocephala*, sp., associated with them, which is distinct from any found elsewhere, and he suggests that this fact is of some importance as indicating at least long isolation from their nearest allies. In the absence of larger specimens, however, and considering that they exhibit no differentiating structural characters it seems best to regard these example as representing only a variety of *A. serratus*, which may be distinguished by the name *hirsutus*.

The colour variations of *A. serratus* are very striking, but cannot be investigated without the examination of a large series of fresh specimens from many localities. Some examples from the Blue Mountains are bright pink in life as in Shaw's original figure. McCoy³ describes and figures Murray River specimens as light blue, while adults from around Sydney are largely dark green ornamented with deep blue and red.

Astucopsis serratus is known from the Murray River and its tributaries (Haswell⁴, McCoy⁵, Smith⁶, Austr. Mus.); Yarra, Plenty and Bunyip Rivers, Victoria (Smith); Blue Mountains, New South Wales (Haswell, Smith, Austr. Mus.); Parramatta and near Sydney (Smith, Austr. Mus.); Mt. Kosciuszko (Austr. Mus.); various coastal localities from Bundanoon and Wollongong to Barrington Tops and Dorrego, New South Wales (Austr. Mus.); ? Richmond River (Haswell); Lyra, near Stanthorpe, Queensland (Austr. Mus.).

³ McCoy—Prodr. Zool. Vict., Dec. ii., 1878, pl. xv.

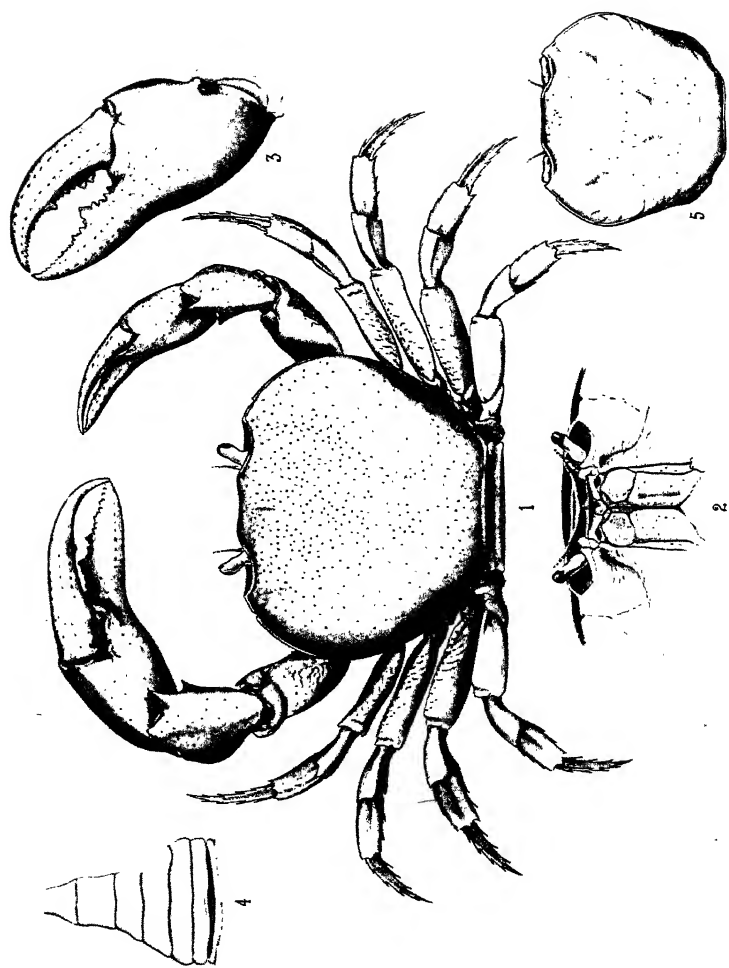
⁴ Haswell—Cat. Austr. Crust., 1882, p. 174.

⁵ McCoy—Prodr. Zool. Vict., Dec. ii., 1878, pl. xv.

⁶ Smith—Proc. Zool. Soc., 1912, p. 157, pls. xvi.-xviii.

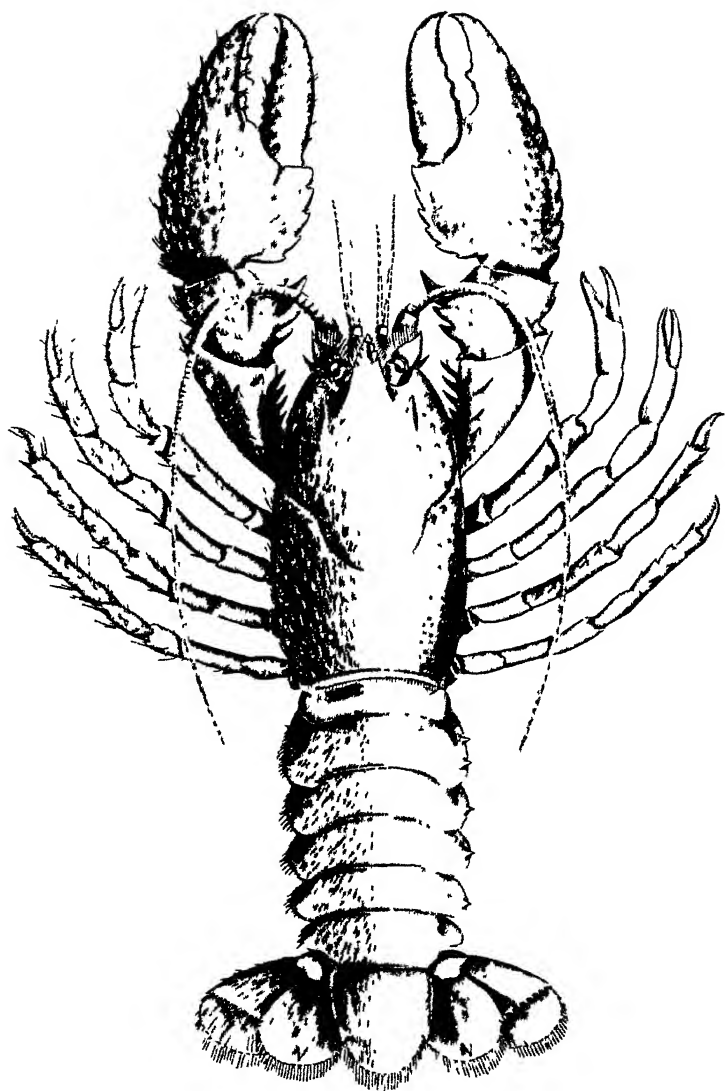
EXPLANATION OF PLATE VIII

- Fig. 1. *Geothelphusa leichardti*, Miers. An adult male, 44mm. wide. Twenty miles west of Hughenden, North Queensland.
- Fig. 2. Mouth-parts and front of the same specimen.
- Fig. 3. Larger cheliped of the same specimen.
- Fig. 4. Abdomen of the same specimen.
- Fig. 5. *Geothelphusa leichardti*, var. *plana*, var. nov. Type of variety, 30½mm. wide. Eureka Creek, Walsh River, North Queensland.



EXPLANATION OF PLATE XLIII.

Astacopsis serratus, Shaw, var. *hirsutus*, var. nov. Type of variety, 76mm. long. Belmore Falls Creek, New South Wales.



AN AUSTRALIAN AMPHIPORA.

By R. ETHERIDGE, Junr, Director and Curator, Australian
Museum, Sydney

(Plates xlii.-xlv)

In his "Monograph of the British Stromatoporoids," Prof. H. A. Nicholson said, "so far as known *Amphipora* is represented by one species only, viz.: the form described by Phillips under the name of (*Amphipora ramosa* (Fig. and Descript. Pal. Foss., p. 19.) This remarkable species occurs in vast numbers in the Devonian Rocks of Germany and Devonshire, apparently occupying in the former region, as probable in the latter also, a definite horizon in the upper portion of the Middle Devonian series (the *Ramosa-Bänke* of Schulz)"¹

The researches of Mr. A. J. Shearsby, of Yass, have revealed many interesting fossils from the rich Murrumbidgee beds, not the least interesting being that about to be described.

In *A. ramosa*, Phillips the *cœnosteum*, or calcareous skeleton, is in the form of slender cylindrical stems, which may or may not increase by dichotomy. Each branch is occupied by a longitudinal, axial, central canal, or tube, which may be intersected by tabulæ, transverse or funnel-shaped. The general skeletal tissue is of the Stromatoporoid type, continuously reticulated, but compact instead of being minutely porous. Irregular zooidal tubes radiate outwards from the axial tube to open on the surface by definite apertures. The appearance of the *cœnostial* surface varies, either these apertures are visible with vermiculate or tuberculate margins, or the cylindrical branches are surrounded by a zone of lenticular vesicles, enveloped by a delicate apparently imperforate calcareous membrane. The general tissue is completely reticulate and there are neither radial pillars nor concentric laminæ as distinct structures (*Nicholson*)

¹ Nicholson—Mon Brit. Stromatoporoids, Pt. i, 1886, p. 109.

We may now ascertain how far the Murrumbidgee form agrees with this definition. In the first place, however, all macroscopic characters must be omitted as the various coenostem fragments are matted together in black limestone, and not weathered-out. The longest measurable fragment is 35mm., and the general diameter of the branches 2mm.

In viewing a transverse section the agreement with the structure of *A. ramosa* as portrayed in Prof. Nicholson's figures² is remarkable. The axial tube is always visible, and of comparatively large size. This is surrounded by the sectioned zoöidal tubes of variable size and outline, piercing the homogeneous compact (in fact dense) skeletal tissue. Nicholson described two conditions of the surface, as already explained, both of which may be seen in our sections. In some instances the peripheral ends of the zoöidal tubes are visible as clear cellular spaces, like those of an ordinary ramose coral, more or less quadrangular in outline; these then represent that condition of *Amphipora* in which the surface apertures of the tubes are not covered by a thin membrane. In other sectioned branches the peripheral area or ring is occupied by vesicles over the greater portion of its extent, in conjunction with other vesicular tissue in the before-mentioned zoöidal tubes; such may possibly represent the second condition of *Amphipora* in which the apertures are covered with a membrane. The tissues are all compact and opaque, there is no trace of porosity, and I have failed to distinguish tabulæ.

In longitudinal sections I found it very difficult to exactly locate the axial tube. This arose no doubt from the various angles at which the branches are disposed in the matrix. All the characters described under the transverse section are repeated here.

A comparison with Prof. Nicholson's figures (two of which are reproduced for comparison) with those now given, will at once indicate the close agreement there is between the two forms—European and Australian. Whether other forms have been described since he wrote, I am unaware, but if his statement still holds good that *A. ramosa* is the only known species so far, the present fossil will be a welcome addition and may be

² Nicholson—*Loc. cit.*, pl. ix., fig. 3, pl. xxix., figs. 5 and 6.

known as *A. australasica*. Possibly a second species is known, for Mr. F. Chapman has recorded "a small digitate (?) stromatoporoid bearing some resemblance to *Amphipora*," from the Aberfeldy River, Co. Tangil, Victoria³.

Loc.—Quarry, one mile west-south-west of Style's House, near Boambolo Crossing, Murrumbidgee River.

Hor.—In all probability this fossil is from Mr. L. F. Harper's Glen Bower Series, a "small inlier of Silurian rocks found in the porphyry intrusion south of Mr. Style's house, in Portion 5, Pa. Cavan"⁴, which accords fairly well with Mr. Shearsby's locality.

³ Chapman—Rec. Geol. Survey Vict., ii., pt. 1, 1907, p. 68.

⁴ Harper—Rec. Geol. Survey N.S. Wales, ix., pt. 1, 1909, p. 39, map ii.

EXPLANATION OF PLATE XLIV.

Amphipora australasica, *Eth. fil.*

Transverse section of numerous branches. It is not all that could be desired in consequence of the dense opaque nature of the matrix. In each instance the white central, more or less circular patch is the axial tube; the smaller irregularly formed patches are the cut ends of the zooidal tubes. The branch at the top centre around the periphery distinctly shows the more or less quadrangular tubes referred to in the text, whilst in the two largest branches, one on each side towards the bottom, the large peripheral white portions represent the marginal vesicles —x 7 diam. (Compare pl. xlv., fig. 2.)



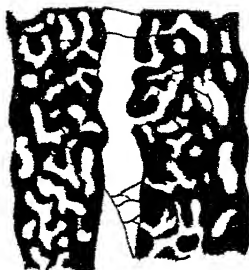
EXPLANATION OF PLATE XLV

Amphipora australasica, *Eth. fil.*

- Fig. 1. Longitudinal section of portion of a hand specimen displaying several branches, in all of which the continuously reticulate tissue is visible, and at the upper end of the second branch (inwards) on the left of the figure may be seen a small length of the axial canal—x 4 diam

Amphipora ramosa, *Phillips, sp.*

- Fig. 2. Transverse section of a branch showing "the axial tube and large marginal vesicles, with intermediate reticulated tissue" (*after Nicholson*)—x 12 diam.
- Fig. 3. Longitudinal section of a branch in which "marginal vesicles are not developed, and the axial canal is intersected by well developed tabulæ" (*after Nicholson*)—x 8 diam



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